SPECIAL REPORT
Force Reduction Impacts on Resourcing Army Operational Requirements

By
Dynamics Research Corporation

In Partial Fulfillment of A Contract

Administered by Battelle Chapel Hill Operations

For
U.S. Army Materiel Systems Analysis Activity
U.S. Army Materiel Command

March 10, 2017
Contract No. W911NF-11-D-0001
TCN 12-072
Scientific Services Program

This page intentionally left blank

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. **PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.**

1. REPORT DATE (DD-MM-YYYY) 03/10/2017	2. REPORT TYPE Final Report (Edited for public release)	3. DATES COVERED (From - To) 01/03/2013 – 03/09/2014

4. TITLE AND SUBTITLE
Force Reduction Impacts on Resourcing Army Operational Requirements

5a. CONTRACT NUMBER
W911NF-11-D-0001

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)
Britt E. Bray, Clifford Thurman, Paul O'Meara, Alexander B. H. Wong, Paul H. Deitz

5d. PROJECT NUMBER

5e. TASK NUMBER
TCN 12-072

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
DRC, A wholly owned subsidiary of Engility Corporation,
2 Tech Drive
Andover, MA 01810

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)
U.S. Army Materiel Systems Analysis Activity (AMSAA)
392 Hopkins Road
Aberdeen Proving Ground, MD 21005

10. SPONSOR/MONITOR'S ACRONYM(S)
AMSAA

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT
Distribution Unlimited. Cleared for public release.

13. SUPPLEMENTARY NOTES

14. ABSTRACT
This AMSAA study of Force Reduction impacts on the ability to resource operational forces and examines how externally imposed reductions in Army end strength and related force structure changes drive demand and supply projections of personnel and equipment through the gradual transition from ARFORGEN to the Future Force Generation Model. The ability to apply quickly parametric changes to Enterprise Level demand and supply provides an important analytic capability to the institutional Army by identifying potential personnel and equipment overages and shortfalls at Enterprise Level.

15. SUBJECT TERMS
ARFORGEN, Future Force Generation Model, IW, Irregular Warfare, Operating Force (OF), Generating Force (GF), Resourcing

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON BRITT BRAY
a. REPORT UNCLASSIFIED	**b. ABSTRACT** UNCLASSIFIED	**c. THIS PAGE** UNCLASSIFIED	UNL		**19b. TELEPHONE NUMBER** (include area code) (937) 422-7383

Standard Form 298 (Rev. 8-98)

This page intentionally left blank

Table of Contents

TABLE OF TABLES

TABLE OF FIGURES

EXECUTIVE SUMMARY

This AMSAA study of Force Reduction impacts on the ability to resource operational forces examines how externally imposed reductions in Army end strength and related force structure changes drive demand and supply projections of personnel and equipment through the gradual transition from ARFORGEN (See Figure 1. ARFORGEN Model) to the Future Force Generation Model (See Figure 2. FFG Model). The ability to quickly apply parametric changes to enterprise level demand and supply provides an important analytic capability to the Institutional Army by identifying potential personnel and equipment overages and shortfalls to be remedied through the Program Objective Memorandum (POM) process. This study produced an executable model that enables analysts to rapidly generate and compare monthly demand profiles across multiple vignettes for personnel and equipment categories 72 months or more into the future.
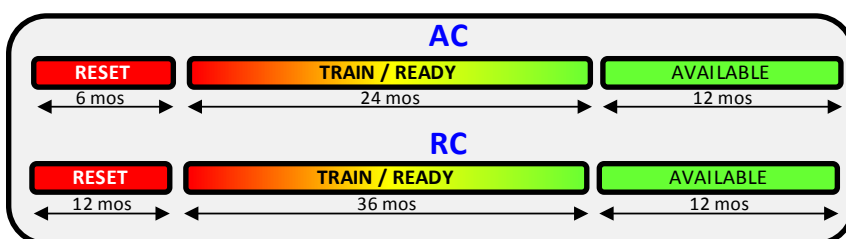
Figure 1. ARFORGEN Model
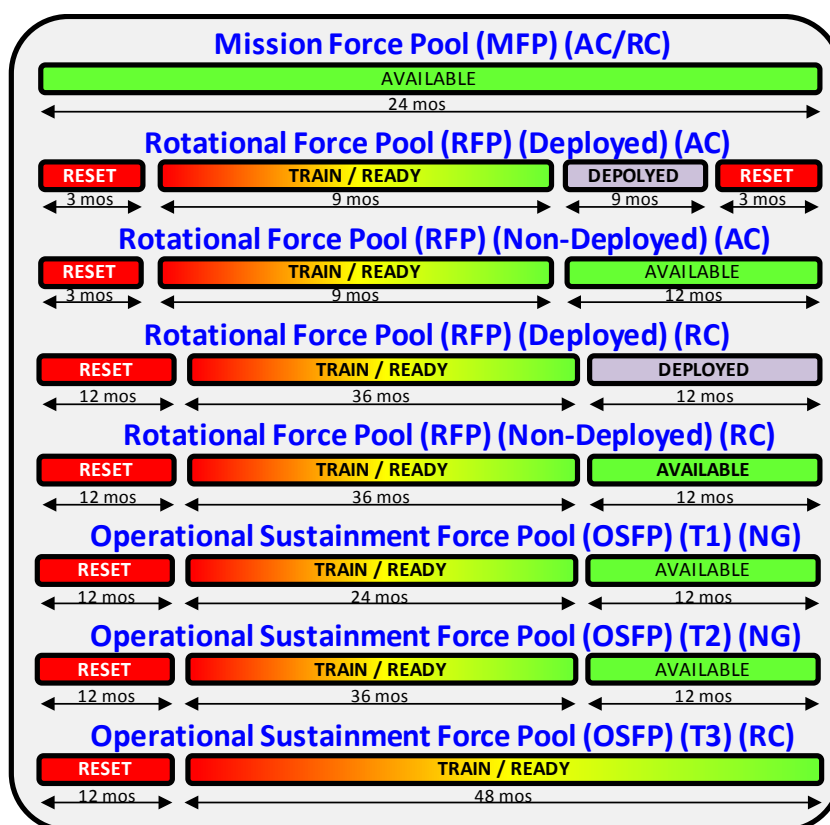
Figure 2. FFG Model

The 2012 Army Posture Statement (U.S. Army, 2012) (APS) included planning guidance to reduce at least 8 active component (AC) Brigade Combat Teams (BCTs) and the further reduction of enough BCTs to enhance remaining BCTs with a third Combined Arms Battalion (CAB). Vignette 1 examined the impact of reducing 8 AC BCTs along with an additional 11 (8 AC; 2 ARNG; 1 USAR) multi-functional and functional support Brigades (BDE). In the absence of published details of the reductions, the number and type of support BDEs were postulated based on Army sustainment and support doctrine. The study team needed to postulate FORSCOM "ribbon charts" reflecting inactivation of the 8 BCTs and 11 support BDEs while continuing to rotate Operating Force (OF) BCTs and BDEs to meet a steady state level of demand with a steady state rotation ratio of 1:3 for AC units (see Figure 3 below). It was critical for the reduced units that their associated personnel and equipment resources were no longer available for distribution following the month of inactivation. Finally the model was modified to account for and maintain a monthly and cumulative total of personnel and equipment resources (by type) reduced as the ribbon chart was executed during each model run.
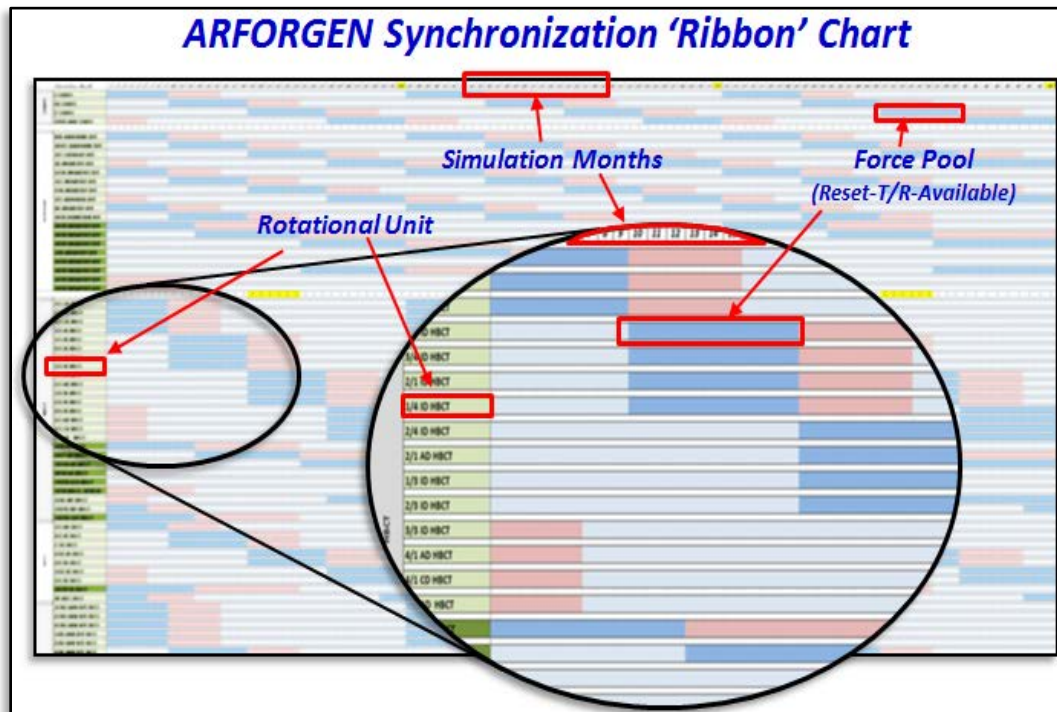
Figure 3. Ribbon Chart

Vignette 2 reduced 6 additional BCTs (for a total of 14) to enable conversion of all remaining AC Army BCTs and Infantry BCTs with an additional CAB. As with Vignette 1, unique ribbon charts were postulated to generate unit rotation schedules that reflected inactivation dates synchronized with reorganization date of remaining BCTs to the enhanced Modified Tables of Organization and Equipment (MTOEs).

Figure 4 below illustrates the model output of New (meaning in addition to the initial quantity in the system) Supply for M1 Tank Section Chiefs and Gunners (MOS 19K30E6K and 19K20E5K) required to support the deployment schedule illustrated in Figure 3 above. The profile illustrates the quantity demanded each month over a 72 - month simulation period by component (AC and ARNG).   For the E6 we see a National Guard Base with an initial quantity of 144, the Active Component with 423, and none are in the Army Reserves. Note that results for both vignettes 1 and 2 are also displayed. Figure 4 not only shows the quantity disparity between the two MOS's and captures widely different supply profiles, but also the level of resolution the MOS's are being accounted for in the simulation.
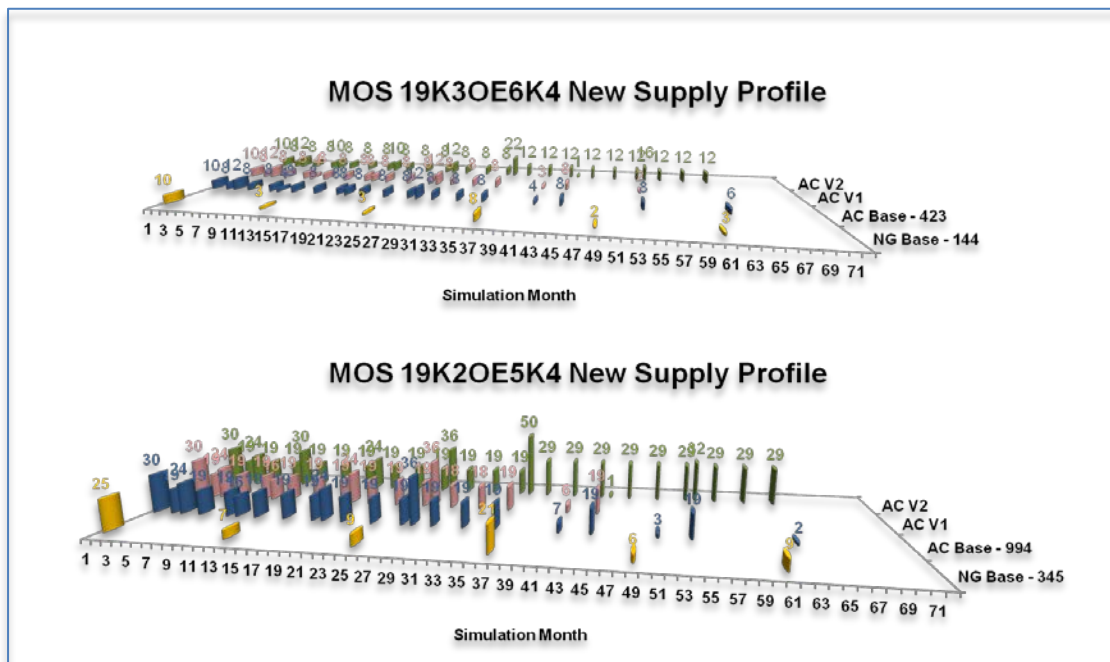
Figure 4. New Supply (MOS – Tank Crew E6/E5)

A major study objective was to incorporate the expected transition from the ARFORGEN model to support units in Afghanistan and the Global Response Force from 2013 through 2014 to the Future Force Generation (FFG) Model supporting regionally aligned and mission tailored forces from 2014 through 2016 as outlined in the 2013 Army Equipping Guidance (HQDA, 2013). Vignette 3 addressed the resulting changes in Army business rules and resourcing priorities. Further clarification of planned force structure changes by HQDA, announced after the completion of vignettes 1 and 2, were also incorporated. It also projects the impact of 3 different demand levels over the course of a 180-month period. This was done to reflect the uncertainty about future threats and the published desire of the Senior Leadership Department of the Army (SLDA) to be prepared to reverse course if necessary to meet potential threats,. To cover a spectrum of supply conditions, each demand level was parametrically filled using one unconstrained, and two (75% and 50% of Base) levels of constrained supply profiles (see Figure 5).
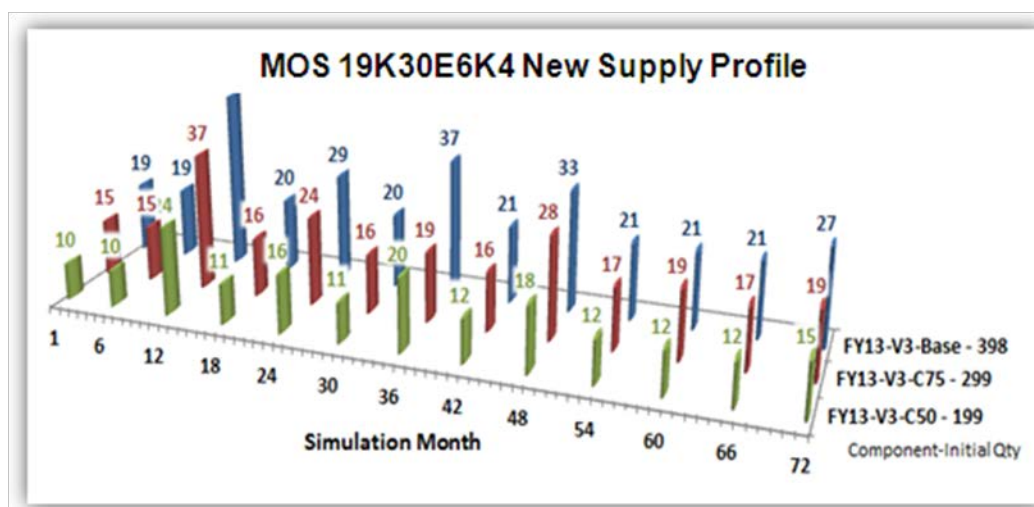
Figure 5. New Supply (MOS 19K30E6K4 – Tank Crew)

Vignette 4 applies the same force structure changes made for Vignette 3 but applies the ARFORGEN model with steady state demand throughout the 72 month simulation period. This enables a quick comparison of resource demand generated using ARFORGEN versus FFG for the same period (Figure 6).
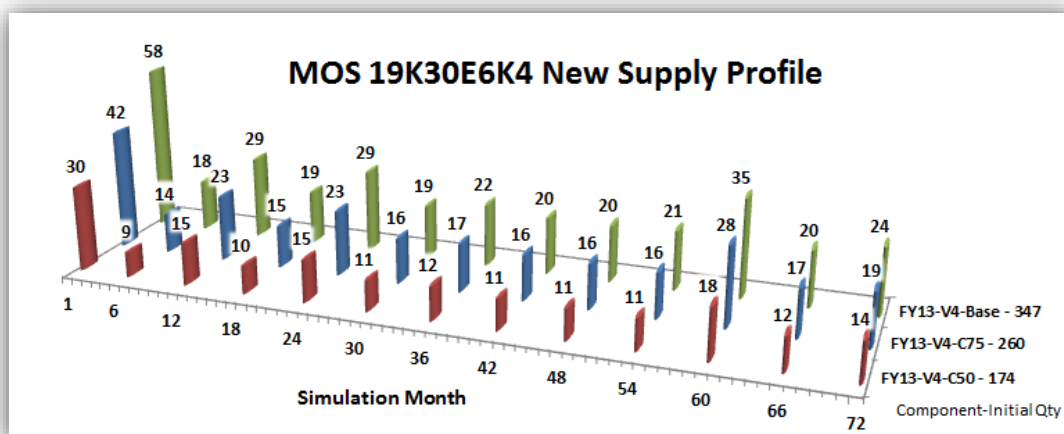
Figure 6. New Supply (MOS 19K30E6K4 – Tank Crew)

In summary, the results of this study address a critical gap in the Institutional Army's capability to better understand, analyze and address the manning and equipping implications of rapidly shifting force structure and policy changes. Using or incorporating the functionality of this model, analysts can project changes in resource demand at the enterprise level for a wide variety of scenarios with much greater specificity in terms of what resources will be required, when, where and in what quantities. Additional vignettes could be developed to reflect a wide range of operational scenarios. Results of executing model runs on these vignettes can then be analyzed to predict the manning, equipping and readiness impacts of alternative force structure designs, resource constraints, and policy decisions.

1. BACKGROUND

This study began as an extension of the previous year's Irregular Warfare Demand Signals (IWDS) study (DRC, 2012). As that study was winding down and the IWDS beta version model was being assessed by RAND, then VCSA (GEN (R) Chiarelli) and the Deputy Director for the Army Office of Business Transformation (OBT), Mr. Robin Swan, were already asking if the model could be adapted to account for force structure and enterprise level policy changes being considered in response to rapidly changing operational requirements. Knowing these changes were coming, AMSAA proposed to conduct a follow on study to enable the modifications needed to examine manning and equipping impacts of anticipated and announced end strength reductions, force structure changes and policy modifications. The IWDS study analyzed the impact of manning and equipping nonstandard (i.e. not documented in the Army Force Structure) organizations on the Army's ability to generate Operating Force (OF) rotational and non-rotational conventional units in response to Combatant Commander requirements. We also incorporated resource demand signals from the Army generating force (GF) based on Army personnel rotation policies, manning and equipping guidance, and resource distribution priorities. The GF consists of a wide array of Army organizations whose primary mission is to generated and sustain the operational Army[1]. While the current study maintains those nonstandard units within the database and also incorporates them at varying numbers, their impact was not a focus of the analysis.

Ultimately this study to analyze Force Reduction Impacts on Resourcing Army Operational Requirements unfolded in two phases. Phase one began with contract initiation in January, 2013 when the only information available to the team about impending changes was contained in the 2012 Army Posture Statement (APS) (U.S. Army, 2012). Lacking more detailed information at that time, the study team decided to structure the first two analytical vignettes around the end strength reductions and potential force structure changes described in the APS. Planning and staffing for the modified force generation process was still underway with no official announcement or description of the details at that time. Consequently this phase of the study applied the ARFORGEN process with a steady state level of demand[2] as the primary driver to determine manpower and equipment demand signals.

As work on developing, executing and analyzing results of vignettes 1 and 2 was being completed, the AMSAA study-team lead established contact with the ARFORGEN lead for the FORSCOM G3/5/7. This team was working the development and implementation of the Future Force Generation Model and he was gracious enough to meet telephonically to discuss the study effort and sketch out the main components of the Future Force Generation model. At the same time, the DRC office at Leavenworth, Kansas, coordinated with TRADOC's Combined Arms Center (CAC) to receive copies of briefings on the new force generation model. During a follow on meeting with the FORSCOM G3/5/7 representative, the team briefed back our

---

[1] FM 1-01, Generating Force Support for Operations, dtd. April 2008, pg. iii

[2] See Army Regulation 525-29, Army Force Generation (ARFORGEN), dtd. 14 March 2011, para. 1-7(e)

understanding of the Future Force Generation (FFG) model which was then validated. Coincidentally, the Army Unit Force Structure Reorganization Plan, published 25 June, 2013 (HQDA G3/5/7, 2013) provided much greater detail on the number, composition and timing of BCT inactivations and reorganizations envisioned by the Chief of Staff of the Army (CSA) and Secretary of the Army (SA) than was originally provided in the 2012 APS.

With this new and more detailed information now on hand, the study team decided to focus a second phase of the study on modifying what had now become known as the Force Generation Resourcing Model (FGRM) to enable analysis of the manning and equipping impacts of the new force structure guidance in conjunction with transition to the FFG model. Given guidance in the Army Reorganization Plan to prepare for potential increases in demand for Army forces in response to unexpected threats, we also opted to develop a 4th Vignette applying the planned force structure changes with OF units rotating through the ARFORGEN model.

2. TECHNICAL DISCUSSION

2.1 Decomposing the Force Generation mission.

2.1.1 Research

To study the influence of force-reduction impacts, the team needed to understand completely Army requirements related to force structure, manning/equipping, and the Force Generation processes. The team used both authoritative and generally accepted 'unofficial' publications and references to better understand and apply the appropriate Army business rules governing force generation and resource prioritization and distribution. The study team used many references during the project including Warfighting Function and branch specific doctrine and training publications and online knowledge repositories (official and unofficial) addressing unit structure and missions. The following are the core references used by the study team.

- AR 220-1 (Unit Status Reporting and Force Registration – Consolidated Policies), dtd. 15 April 2010
- AR 350-1 (Army Training and Leader Development), dtd. 18 December 2009
- AR 525-29 (Army Force Generation), dtd. 14 March 2011
- FC 350-1 (Training Management, Training Under ARFORGEN), dtd. 12 April, 2014)
- FKSM 71-8 (Armor/Cavalry Reference Data – Support Brigades), dtd. May 2010
- FKSM 71-8 (Armor/Cavalry Reference Data – Brigade Combat Teams), dtd. May 2011
- "How the Army Runs, A Senior Leader Reference handbook, 2011-2012", U.S. Army War College
- U.S. Army Forces Command Campaign Plan 2011-2015
- "The Army Green Book, 2012-2013", Association of the U.S. Army, dtd. October 2012

- Army Equipment Modernization Plan 2014, dtd. 13 May 2013
- Army Equipping Guidance 2013 Through 2016, dtd. 20 June 2013
- Army Training Strategy (ATS), dtd. 15 October 2012
- Army Posture Statement (APS) 2012, dtd. February 2012
- Army Strategic Planning Guidance (ASPG) 2013, dtd. February 2012

2.1.1.1 Force Structure

The study team reused organizational and force structure data developed through research conducted for the earlier IWDS study (DRC, 2012) to determine current Army organizational command structure in order to update the comprehensive 'Unit' database for the model. Appendix A describes the analytic underpinnings used in this study; Appendix B reviews a rigorous way to reason about force generation effectiveness. Appendix C provides a comprehensive unit list. For this study, DRC identified and added location data for each unit in the data base. This additional information was included to potentially assist in developing equipping strategies designed to reduce cost by avoiding/reducing second destination shipping. FMSWeb site (https://**fmsweb**.army.mil/) was used as the primary source for authoritative and current, (at time of model development), unit Modified Tables of Organization and Equipment (MTOEs) and Tables of Distribution and Allowance (TDAs).

2.1.1.2 Manning/Equipping

The study team reused the MTOEs, TDAs and unofficial Non Standard Unit (NSU) authorizations downloaded and developed (in the case of the NSUs) for the IWDS study to determine personnel and equipment authorizations for each type organization. We also re-applied the resourcing priorities from the IWDS study for the three analytical vignettes that used the ARFORGEN model versus the FFG model.

2.1.1.3 Army Force Generation (ARFORGEN)

The ARFORGEN process is defined as "the Army's core process for force generation, executed with supporting-to-supported relationships, that cycles units through three force pools: RESET, Train/Ready, and Available." The three force pools are defined by activities and time where certain unit functions occur related to training, manning and equipping. This operational readiness cycle process only applies to units defined as rotational structure (i.e. OF rotational units). OF non-rotational and GF units will maintain a level of training, manning and equipping readiness for their missions as determined by Headquarters, Department of the Army (HQDA) prioritization documents[3]. The RESET force pool consists of units conducting reintegration, unit reconstitution, key personnel turnover, medical readiness reintegration, professional military education (PME) and unit training below the platoon level. The Train/Ready force pool consists of units conducting individual and collective training, completion of

---

[3] AR 525-29, para 1-7

PME, receipt of new personnel and equipment and training activities building up to and including proficiency on brigade level tasks. The Available force pool consists of units allocated or deployed to a Combatant Commander (CCDR) as a Deployment Expeditionary Force (DEF) or they are allocated for contingency operations as a Contingency Expeditionary Force (CEF). Both DEF and CEF units are fully trained in accordance with their Full Spectrum Operations (FSO) Mission Essential Task Lists (METLs). For specific model parameters, see section 2.4, The Force Generation Resourcing Model (FGRM).

The ARFORGEN cycle also provides flexibility in terms of demand over time known as the Demand Spectrum. The demand spectrum is divided into three levels; steady-state, surge and full surge. We focused on the steady-state level however, the model is flexible and can be adjusted to accommodate all three levels of the demand spectrum. According to AR 525-29, pg. 2., "…steady-state rotation occurs when the amount of forces in the Available Force Pool exceeds requirements (supply exceeds demand)." The steady-state cycle for AC units is 36 months; 6 months for RESET, 21 months for Train/Ready and 9 months for Available. The steady-state cycle for RC units is 72 months; 12 months for RESET, 48 months for Train/Ready and 12 months for Available. See Appendix G (Ribbon Chart – Sourcing Matrix) for the layout of all OF rotational forces (AC and RC) contained in the model database and programmed across the steady-state ARFORGEN cycle. All OF rotational units were assigned R-Dates in order to achieve the required available force pool population as defined in AR 525-29, pg. 3., "In a steady-state the Army generates an output of 1 Corps HQ, 4 Division HQs, 15 BCTs, and approximately 75K enablers."

2.1.1.4 Future Force Generation (FFG)

This study also uses the evolving FFG Model which was derived from various sources such as the Army Strategic Planning Guidance (ASPG) 2013 (HQDA, 2013), and from the Army G8, the Army Equipping Guidance (AEG) 2013-2016 (HQDA, 2013). According to the ASPG 2013, the Army is adapting the FFG model in order to "avoid the costs caused by generating readiness in excess of requirements." As described by the AEG 2013-2016, the FFG model "consists of three distinct Force Pools: Mission Force Pool (MFP), Rotational Force Pool (RFP), and the Operational Sustainment Force Pool (OSFP). The equipping goals are not the same for all units in all force pools." Similarly, manning and training goals also differ with regard to the three force pools. (See Figure 7, Future Force Generation Force Pools).
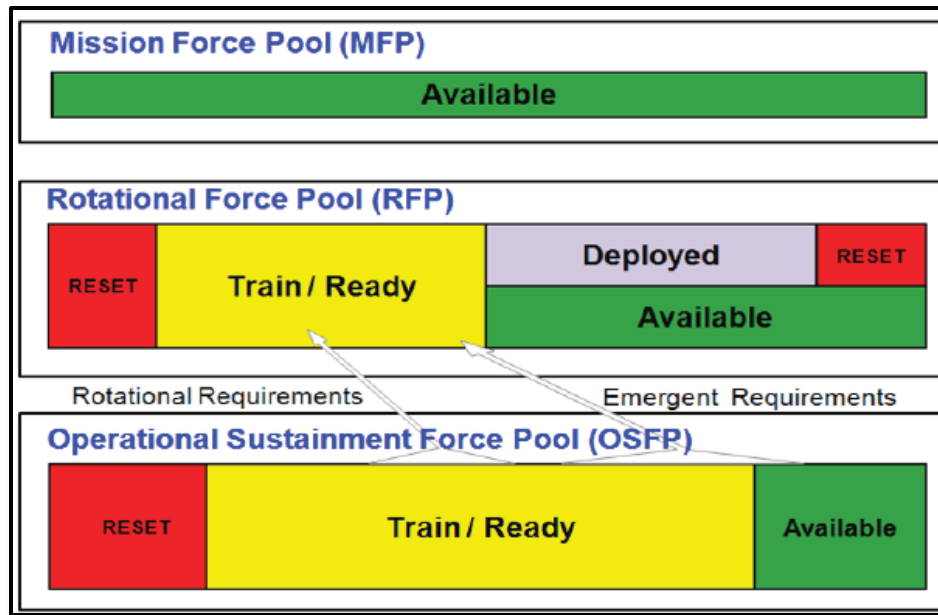
Figure 7. Future Force Generation Force Pools

Similar to the ARFORGEN model, the three force pools are defined by activities and time however, unlike ARFORGEN, the FFG model accounts for all operating force units both rotational and non-rotational. Generating forces maintain a level of training, manning and equipping readiness at similar levels as they did for ARFORGEN. The Mission Force Pool consists of units such as committed theater level forces, low density units with high operational demand requirements and units that are required to maintain a high level of sustained readiness for immediate employment/deployment. Rotational Force Pool units are those forces apportioned for a contingency plan or specific deployment. These forces will move through training phases of Reset, Train/Ready and Available in preparation for the stated contingency or actual deployment. The Operational Sustainment Force Pool consists of all remaining operating force units which are not allocated or apportioned to planned contingencies or operations.

A demand spectrum was not officially established or described by any of the Future Force Generation model sources however, the study team felt that differing levels of demand were needed to provide rigor and depth for FFG model runs. As the ARFORGEN model provided demand standards described as steady state, surge and full surge, FFG demand levels were created based on guidance in the ASPG 2013 that "the Army will avoid the costs caused by generating readiness in excess of requirements". Further, the study team used BCTs as the foundation, driving all other enabler/unit requirements. This development methodology led us to subjectively develop three demand levels. The three levels were defined as Low Demand (LD), where demand is generally aligned with requirements for the Army to support three deployed BCTs, Medium Demand (MD) where demand is generally aligned with requirements for the Army to support six deployed BCTs and High Demand (HD) where demand is generally aligned with requirements for the Army to support fifteen

deployed BCTs. To provide even greater context to the FFG model runs, the three demand levels were interspersed within a full FFG demand profile (72 months) in order to create a 'Demand Profile' as shown in Table 1 below.

Table 1. FFG cycle with three demand levels interspersed

Example FFG Model Demand Profile (72 months)					
1-12	13-24	25-36	37-48	49-60	61-72
LD (3 x BCTs)	MD (6 x BCTs)		HD (15 x BCTs)		MD (6 x BCTs)

2.1.2 Identifying and Collecting Unit Authorization Data

We elected to re-use the unit types, authorizations and organizational structures already contained in the model database developed for the IWDS study (DRC, 2012). That database was populated by units documented in the Army force structure and divided between the Operating Force (OF) (both globally available rotational structure and globally available non-rotational structure) and the Generating Force (GF) from both the AC and RC. Also included in the database was a set of organizations previously identified and hereafter referred to as non-standard units (NSUs), (which are not documented in the Army force structure). All unit authorizations for personnel and equipment for units in the Army Force Structure were derived from approved authorization documents available via the U.S. Army Force Management Support Agency's (USAFMSA) Force Management System Web Site (FMSWeb)[4]. Unit authorizations for personnel for units not in the Army Force Structure (NSUs) were originally derived from analysis of an FOUO consolidated rollup of Joint Manning Document (JMD) authorizations from the Joint Staff J1. We generated several NSU types (with associated unclassified and ad-hoc authorization documents) based on ad-hoc units operating in Afghanistan and previously in Iraq by examining requirements for personnel specialties that the Army was tasked to fill. JMDs do not include requirements for equipment, however we created hypothetical requirements for certain equipment LINs that made sense given the unit role and mission in order to generate a demand function for equipment from the NSUs. The team also generated unit authorizations for personnel and equipment for two different types of Advise and Assist Brigades using the augmentation TDAs for OEF and OIF available via FMSWeb. MTOE OF units in the model database included all Corps HQs, Division HQs, ABCTs, IBCTs, SBCTs, Multi-Functional Brigades, Functional Brigades, Special Brigades and select NSUs. The TDA GF units in the database included organizations with authorizations of greater than 100 military personnel. All organizational structures for units were either included with the FMSWeb unit download or verified with current doctrine. Most unit structures in the database are organized at the brigade/group/command level. Total authorizations for personnel and equipment include authorizations for all doctrinal subordinate elements to that particular echelon and are aggregated at the brigade/ group/ command level. Each of these doctrinal echelons was compiled into one data file. Subordinate elements for BCTs are clearly

---

[4] https://**fmsweb**.army.mil/

described in FMSWeb however, other organizations were not clearly stated and in those cases, doctrine for that particular organization was used to determine task organization. Also note that whenever possible like organizations were duplicated to reflect the total amount (e.g., there are 25 ABCTs authorized in the Army inventory, therefore, one ABCT and all its subordinate organizations were compiled and then duplicated in the database to represent 25 ABCTs). However, when individual instances of like organizations were determined to differ considerably, those organizations were downloaded separately and not duplicated (i.e. Heavy, Medium and Expeditionary Combat Aviation Brigades). See Table 2 below for units included in the database.

Table 2. Units in the Database

Unit	Type	Total (RC)
Corps	OF	4/3[1]
Division	OF	18 (8)
Armor Brigade Combat Team	OF	25 (7)
Infantry Brigade Combat Team	OF	40 (20)
Striker Brigade Combat Team	OF	9 (1)
Multi-Functional Brigades		
Battlefield Surveillance Brigade	OF	10 (7)
Fires Brigade	OF	14 (7)
Maneuver Enhancement Brigade	OF	21 (18)
Sustainment Brigade	OF	32 (19)
Combat Aviation Brigade (Hvy, Med and Exp)	OF	20 (8)
Functional Brigades		
Air Defense Artillery Brigade	OF	7 (2)
Signal Brigade	OF	13 (4)
Engineer Brigade	OF	17 (11)
Chemical Brigade	OF	3 (2)
Military Intelligence Brigade	OF	5
Military Police Brigade	OF	12 (7)
Military Police, Criminal Investigation Command	OF	2
Ordinance, Explosive Ordinance Disposal Group	OF	3 (1)
Medical Brigade	OF	14 (10)
Regional Support Group	OF	46 (45)
Theater Aviation Brigade/Command/Operations Group	OF	9 (8)
Special Brigades		
Civil Affairs Brigade	OF	10 (7)
Information Operations Group	OF	4 (4)
Army Air and Missile Defense Command	OF	4 (1)
Space Brigade	OF	1
Theater Aviation Maintenance Support Group	OF	5 (5)
Non-Standard Units		
Advise and Assist Augmentation Teams	OF	4

Unit	Type	Total (RC)
Joint Manning Document Organizations (USA)	OF	13
Table of Distribution and Allowances (TDA) Units		
Various organizations	GF	517
Total		882
Notes: [1] Four Corps HQs were used for V1 & V2, Three for V3 & V4		

2.2 Developing the Vignettes

Using results from the FY12 IWDS study as the baselines, the study team developed four analytical vignettes. The intent was to develop analytical vignettes reflecting planned or announced end strength reduction and force structure changes in order to: project demand for personnel and equipment on a monthly basis over 72 months at the enterprise, component, unit type and specific unit level; generate manning and equipping fill rates as a percentage of target fill for unit types and specific units each month; and determine the potential resourcing, planning and programming implications at the Army Enterprise level.

Two separate force generation models were used with this study effort detailed in paragraphs 2.1.1.3 and 2.1.1.4 above. The ARFORGEN Model was used for vignettes 1, 2 and 4 and the evolving FFG Model was used for vignette 3.

Vignettes 1 and 2 were developed using guidance derived from the FY12 Army Posture Statement (U.S. Army, 2012), "Over the next five years, the Army will decrease its end-strength from a peak authorized strength of about 570,000 to 490,000 Active Army, 358,000 to 353,500 Army National Guard and 206,000 to 205,000 Army Reserve Soldiers as directed. Today we plan on reducing at least 8 active component Brigade Combat Teams (BCT)."
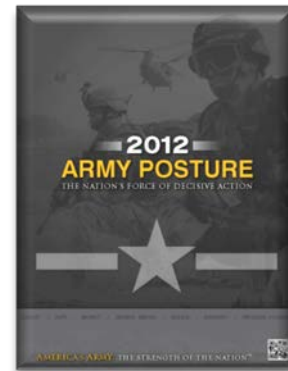
Vignettes 3 and 4 were developed based on the Chief of Staff of the Army (CSA) Army Reorganization Plan (HQDA G3/5/7, 2013) announcement in June 2013 which outlined the following guidance concerning end strength reductions and force structure changes:

- Reorganize BCTs from 43 to 33: 3 ABCTs, 6 IBCTs and 1 SBCT planned for inactivation by the end of FY17.
- 80K Active Component Soldier reduction by end of FY17 (an additional BCT to reorganize at a 'later date').
- 8K National Guard Soldier reduction achieved through attrition (no substantial force structure changes).
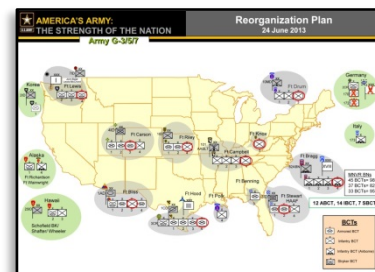
- USAR forgoing 1K Soldier increase.
- Remaining AC BCTs will get additional capabilities (*bolstering remaining brigades*)
- Third maneuver battalion to A&I BCTs.
- Additional engineer capabilities (gap crossing and route clearance) to A&I BCTs.
- Additional fires capability, transform from 2x8 Fires Battalion to 3x6 to A&I BCTs.
- Army plans to convert BSTB (within A&I BCTs) into 'Brigade Engineering Battalions'.
- SBCT already has 3 CABs but no BSTB so they'll get a 'Brigade Engineering Battalion'.

A brief description of each of the vignettes follows below. Greater details about vignette starting conditions, input parameters and results of model execution runs may be found in Appendix G (Study Results) of the report.

2.2.1 Vignette 1

The first vignette was designed to determine the impact of force structure changes outlined in the FY12 Army Posture Statement with resource demand signals generated by rotational OF units rotating through the ARFORGEN under a steady state level of demand. Details of the force reduction applied follow:

- Reduce 8 active component BCTs.
  - 3 – ABCTs
  - 4 – IBCTs
  - 1 - SBCT
- Reduce 11 Support Brigades as a consequence from BCT reduction.
  - 1 – FiB (AC)
  - 2 – MEB (1 AC and 1 AR)
  - 4 – SUS BDEs (3 AC and 1 NG)
  - 2 – ENG BDEs (1 AC and 1 NG)
  - 1 – SIG BDE (AC)
  - 1 – MED BDE (AC)

Table 3. V1 Ribbon Chart (Only SBCT Shown as Example)

Unit Name	Unit Type	Unit Designator	Start Month	Start Phase	Start Month In Phase	Drawdown
3D ARMOR CAVALRY REGIMENT	SBCT	CEF	0	T/R	21	FALSE
HHC, 1ST BRIGADE COMBAT TEAM, 25TH INFANTRY D	SBCT	DEF	0	T/R	12	FALSE
HHC, 2D BRIGADE COMBAT TEAM, 25TH INFANTRY DI	SBCT	DEF	0	T/R	12	FALSE
HHC, 2D BRIGADE COMBAT TEAM, 2D INFANTRY DIVI	SBCT	DEF	0	T/R	3	FALSE
HHC, 3D BRIGADE COMBAT TEAM, 2D INFANTRY DIVI	SBCT	DEF	0	T/R	3	FALSE
HHC, 4TH BRIGADE COMBAT TEAM, 2D INFANTRY DIV	SBCT	DEF	0	Available	9	FALSE
HHC, 56TH BRIGADE COMBAT TEAM, 28TH INFANTRY	SBCT	CEF	0	Available	12	FALSE
HHT, 2D CAVALRY REGIMENT	SBCT	DEF	0	Available	9	FALSE
HQ, 1ST BRIGADE COMBAT TEAM, 1ST ARMORED DIVI	SBCT	DEF	0	Available	3	TRUE

2.2.2 Vignette 2

Vignette 2, as an extension of vignette 1, was designed to determine the impact of 'further' force reduction beyond the 8 BCTs specified in the FY12 APS while adding one additional Combined Arms Battalion to all remaining AC Brigade Combat Teams. Vignette 2 also applied the ARFORGEN with steady state level of demand. Details of additional force reduction and reorganization follow:

- o Reduce 14 active component BCTs.
  - 6 – ABCTs
  - 7 – IBCTs
  - 1 – SBCT
- o Reorganize remaining active component BCTs with 1 additional Combined Arms Battalion.

Table 4. V2 Ribbon Chart (Only SBCT Shown as Example)

Unit Name	Unit Type	Unit Designator	Start Month	Start Phase	Start Month In Phase	End Month	Draw down	Extra CAB
3D ARMOR CAVALRY REGIMENT	SBCT-12	CEF	0	T/R	21		FALSE	TRUE
HHC, 1ST BRIGADE COMBAT TEAM, 25TH INFANTRY D	SBCT-12	DEF	0	T/R	11		FALSE	TRUE
HHC, 2D BRIGADE COMBAT TEAM, 25TH INFANTRY DI	SBCT-12	DEF	0	T/R	11		FALSE	TRUE
HHC, 2D BRIGADE COMBAT TEAM, 2D INFANTRY DIVI	SBCT-12	DEF	0	T/R	2		FALSE	TRUE
HHC, 3D BRIGADE COMBAT TEAM, 2D INFANTRY DIVI	SBCT-12	DEF	0	T/R	2		FALSE	TRUE
HHC, 4TH BRIGADE COMBAT TEAM, 2D INFANTRY DIV	SBCT-12	DEF	0	Available	9	37	FALSE	TRUE
HHC, 56TH BRIGADE COMBAT TEAM, 28TH INFANTRY	SBCT-12	CEF	0	Available	12		FALSE	FALSE
HHT, 2D CAVALRY REGIMENT	SBCT-12	DEF	0	Available	9	37	FALSE	TRUE
HQ, 1ST BRIGADE COMBAT TEAM, 1ST ARMORED DIVI	SBCT-12	DEF	0	Available	3		TRUE	FALSE

2.2.3 Vignette 3

The third vignette was designed to determine the impact of force structure changes outlined by the CSA Army Reorganization Plan (HQDA G3/5/7, 2013) across three separate demand profiles with OF units rotating through the Future Force Generation model. Details of the force structure changes and other vignette design elements follow.

- o Reduce 10 active component BCTs.

- 3 – ABCTs
- 6 – IBCTs
- 1 – SBCT
- Reorganize all remaining AC ABCTs and IBCTs sequentially as BCTs drawdown (two BCTs can reorganize as one BCT is inactivated).
- BCT changes maintained from vignette 2.
    - Add Third maneuver battalion to A&I BCTs.
    - Add Recon Troop, Forward Support Company and intelligence-medical-support sections.
- Reconfigure/Rename the Brigade Special Troops Battalions (BSTB) within the A&I BCTs to Brigade Engineering Battalions (BEB). (Source: G/3/5/7 DAMO-FM)
    - Add Engineer Company (2 Combat Engineer Platoons, 1 Clearance Platoon).
    - Remove MP Platoons.
    - Signal and MI Company remain unchanged.
- Add Brigade Engineering Battalion to SBCTs. (Old SBCTs did not have a BSTB)
    - Same configuration as the BEB within A&I BCTs with Anti-Armor Company added.
- Enhance the Fires Battalions within BCTs from 2x8 to 3x6. (Source: FCoE, TCM BCT Fires)
    - ABCT, change from SP155 2x8 to SP155 3x6.
    - IBCT, change from Towed 105 2x8 to Towed 105 2x6 and Towed 155 1x6.
    - SBCT, no change from current Fires Battalion (Towed 105 3x6).
- Run model for 72 months (all reorganization occurs by 48th month).
- Establish demand profile which places high demand cycle during reorganization and after

Table 5. V3 Ribbon Chart (Only Profile 1 SBCT shown as example)

Cycle change	Unit Type	Comp	Force Type	Unit Name	Start Month	End Month	Draw Down	Transform	Month in Phase	0
	SBCT	AC	RND	HHC, 4TH BRIGADE COMBAT TEAM, 2D INFANTRY DIV		1	1		9	T
	SBCT-13	AC	RD	HHT, 2D CAVALRY REGIMENT		13		1	9	T
1	SBCT-13	AC	RND	HHT, 2D CAVALRY REGIMENT	13	49			1	R
4	SBCT-13	AC	RD	HHT, 2D CAVALRY REGIMENT	49	61			1	D
5	SBCT-13	AC	RND	HHT, 2D CAVALRY REGIMENT	61				1	R
	SBCT-13	AC	RND	HHC, 2D BRIGADE COMBAT TEAM, 25TH INFANTRY DI		25		1	3	R
2	SBCT-13	AC	RD	HHC, 2D BRIGADE COMBAT TEAM, 25TH INFANTRY DI	25	37			7	T
3	SBCT-13	AC	RND	HHC, 2D BRIGADE COMBAT TEAM, 25TH INFANTRY DI	37	49			1	R
4	SBCT-13	AC	RD	HHC, 2D BRIGADE COMBAT TEAM, 25TH INFANTRY DI	49	61			7	T
5	SBCT-13	AC	RND	HHC, 2D BRIGADE COMBAT TEAM, 25TH INFANTRY DI	61				1	R
	SBCT-13	AC	RND	3D ARMOR CAVALRY REGIMENT		37		13	12	A
3	SBCT-13	AC	RD	3D ARMOR CAVALRY REGIMENT	37	49			1	D
4	SBCT-13	AC	RND	3D ARMOR CAVALRY REGIMENT	49	61			1	R
5	SBCT-13	AC	RD	3D ARMOR CAVALRY REGIMENT	61				1	D
	SBCT	AC	RND	HHC, 1ST BRIGADE COMBAT TEAM, 25TH INFANTRY D		13			9	T
1	SBCT	AC	RD	HHC, 1ST BRIGADE COMBAT TEAM, 25TH INFANTRY D	13	25			7	T
2	SBCT-13	AC	RND	HHC, 1ST BRIGADE COMBAT TEAM, 25TH INFANTRY D	25	37		25	1	A
3	SBCT-13	AC	RD	HHC, 1ST BRIGADE COMBAT TEAM, 25TH INFANTRY D	37	49			7	T
4	SBCT-13	AC	RND	HHC, 1ST BRIGADE COMBAT TEAM, 25TH INFANTRY D	49				1	R
	SBCT	AC	RND	HHC, 2D BRIGADE COMBAT TEAM, 2D INFANTRY DIVI		37			12	A
3	SBCT-13	AC	RD	HHC, 2D BRIGADE COMBAT TEAM, 2D INFANTRY DIVI	37	49		37	1	D
4	SBCT-13	AC	RND	HHC, 2D BRIGADE COMBAT TEAM, 2D INFANTRY DIVI	49				1	R
	SBCT	AC	RND	HHC, 3D BRIGADE COMBAT TEAM, 2D INFANTRY DIVI		37			9	T
3	SBCT-13	AC	RD	HHC, 3D BRIGADE COMBAT TEAM, 2D INFANTRY DIVI	37	49		37	7	T
4	SBCT-13	AC	RD	HHC, 3D BRIGADE COMBAT TEAM, 2D INFANTRY DIVI	49	61			1	D
5	SBCT-13	AC	RND	HHC, 3D BRIGADE COMBAT TEAM, 2D INFANTRY DIVI	61				1	R
	SBCT-13	AC	RND	HQ, 1ST BRIGADE COMBAT TEAM, 1ST ARMORED DIVI		49		25	12	A
4	SBCT-13	AC	RD	HQ, 1ST BRIGADE COMBAT TEAM, 1ST ARMORED DIVI	49	61			1	D
5	SBCT-13	AC	RND	HQ, 1ST BRIGADE COMBAT TEAM, 1ST ARMORED DIVI	61				1	R
	SBCT	NG	OS	HHC, 56TH BRIGADE COMBAT TEAM, 28TH INFANTRY		37			12	T1
3	SBCT	NG	RND	HHC, 56TH BRIGADE COMBAT TEAM, 28TH INFANTRY	37	61			1	A
5	SBCT	NG	OS	HHC, 56TH BRIGADE COMBAT TEAM, 28TH INFANTRY	61				1	T1

R1	Reset 1	T3	Train/Ready 3
R2	Reset 2	T4	Train/Ready 4
T	Train Ready	A	Available
T1	Train/Ready 1	D	Deployed
T2	Train/Ready 2		

2.2.4 Vignette 4

The fourth vignette applied the same force structure changes and starting conditions data as vignette 3 however, rotational OF units rotated through the ARFORGEN model under a steady state level of demand See Table 6 below.

Table 6. V4 Ribbon Chart (Only SBCT shown as example)

Unit Type	Comp	Force Type	Unit Name	Start Month	End Month	Draw Down	Transform	Month in Phase	0
SBCT-12	AC	CEF	3D ARMOR CAVALRY REGIMENT		13		13	21	
SBCT-13	AC	CEF	3D ARMOR CAVALRY REGIMENT	13				4	
SBCT-12	AC	DEF	HHC, 1ST BRIGADE COMBAT TEAM, 25TH INFANTRY D		25		25	12	
SBCT-13	AC	DEF	HHC, 1ST BRIGADE COMBAT TEAM, 25TH INFANTRY D	25				1	
SBCT-12	AC	DEF	HHC, 2D BRIGADE COMBAT TEAM, 25TH INFANTRY DI		1		1	3	
SBCT-13	AC	DEF	HHC, 2D BRIGADE COMBAT TEAM, 25TH INFANTRY DI	1				4	
SBCT-12	AC	DEF	HHC, 2D BRIGADE COMBAT TEAM, 2D INFANTRY DIVI		37		37	9	
SBCT-13	AC	DEF	HHC, 2D BRIGADE COMBAT TEAM, 2D INFANTRY DIVI	37				1	
SBCT-12	AC	DEF	HHC, 3D BRIGADE COMBAT TEAM, 2D INFANTRY DIVI		37		37	21	
SBCT-13	AC	DEF	HHC, 3D BRIGADE COMBAT TEAM, 2D INFANTRY DIVI	37				1	
SBCT-12	AC	DEF	HHC, 4TH BRIGADE COMBAT TEAM, 2D INFANTRY DIV		1	1		9	
SBCT-12	AC	DEF	HHT, 2D CAVALRY REGIMENT		1		1	12	
SBCT-13	AC	DEF	HHT, 2D CAVALRY REGIMENT	1				13	
SBCT-12	AC	DEF	HQ, 1ST BRIGADE COMBAT TEAM, 1ST ARMORED DIVI		25		25	3	
SBCT-13	AC	DEF	HQ, 1ST BRIGADE COMBAT TEAM, 1ST ARMORED DIVI	25				7	
SBCT-12	NG	CEF	HHC, 56TH BRIGADE COMBAT TEAM, 28TH INFANTRY					12	
			Avalible Phase						
			Train/Ready Phase						
			Reset Phase						

2.3 Mapping Outputs to Force Generation Aim Points and Milestones

This study used the two separate force generation models, ARFORGEN and the FFG Model. Both models are designed to generate trained and ready units through the structured progression of unit readiness over time. To keep the study and the model unclassified we decided to develop "notional" ribbon charts for each vignette using either ARFORGEN or the FFG model which would show the progression of rotational conventional OF units through the various ARFORGEN cycles and the progression of all conventional OF units through each phase of their respective FFG force pools (mission force pool, rotational force pool and operational sustainment force pool. This approach had the added advantage of supporting Enterprise level analysis without relying on FORSCOM to provide the actual ribbon charts used with the ARFORGEN Synchronization Tool (AST). The focus of the study was on brigade level organizations and above.

For the ARFORGEN model, we assigned the globally available rotational force units in the database to the three force pools of Reset, Train/Ready and Available according to guidelines in AR 525-29 for the steady-state level of demand. Steady-state demand level requires the Army to generate an output (always available) of 1 Corps Headquarters, 4 Division Headquarters, 15 Brigade Combat Teams and approximately 75K enablers (AR 525-29, para 1-8b). In order to achieve this output, all OF rotational units in the database were assigned an R-Date (R=Reset) offset across a simulated 72 month ARFORGEN cycle to achieve the required available force pool (See Table 7 below). Further, selected OF units were assigned as either

Deployment Expeditionary Force (DEF) or Contingency Expeditionary Force (CEF) for resource distribution priority purposes as described in AR 525-29, para 1-10c.

Table 7. Steady State R Date Assignments

UNIT TYPE			R+0	R+9	R+12	R+18	R+24	R+27	R+36	R+45	R+48	R+54	R+60
CORPS	AC		1	1		1		1					
DIV	AC		3	3		3		1					
	RC		1		1		1		1		1		1
ABCT	AC		4	4		4		5					
	RC		1		1		1		1		1		1
SBCT	AC		2	2		2		1					
	RC												
IBCT	AC		5	5		5		5					
	RC		3		3		3		3		3		3
BFSB	AC		1	1		1							
	RC		2		1		1		1		1		1
FiB	AC		2	2		2		1					
	RC		2		2		2		1				
MEB	AC		1	1		1							
	RC		3		3		3		3		3		3
SUS	AC		2	2		2		2					
	RC		2		2		2		2		2		2
CAB	AC		3	3		3		3					
	RC		1		1		1		1		1		1
ADA	AC		1	1		1		1	1				
	RC												
CM	AC		1										
	RC		1		1								
ENG	AC		1	1		1		1	1				
	RC		2		2		2		2		2		1
MI	AC		1	1		1		1	1				
	RC												
MP	AC		1	1		1		1	1				
	RC		2		2		2		1				
MP (CID)	AC		1	1									
	RC												
SIG	AC		3	3		3							
	RC		1		1		1		1				
EOD	AC		1	1									
	RC				1								
MED	AC		1	1		1		1	1				
	RC		1										
RSG	AC		1										
	RC		3		4		4		4		4		4
TAB	AC		1										
	RC		1		1		1		1		1		1

AR 525-29[5], para 1-11 describes aim points as "a means to track units at a prescribed state of readiness as they move through the ARFORGEN Force Pools and progressively increase readiness". It goes on to say that HQDA "establishes the number and purpose of ARFORGEN aim points in the ARFORGEN Synchronization Order (ASO)". For the purposes of this study, the team reviewed aim points and manning targets contained in FC 350-1[6] and HQDA FY 11 Manning Guidance[7]. We

---

[5] AR 525-29, Army Force Generation, dtd. 14 March 2011

[6] FORSCOM Circular (FC) 350-1, Training Under ARFORGEN, 12 April 2010

[7] Memorandum, dtd. 17 December 2010, Subject: HQDA Active Component (AC) Manning Guidance for Fiscal Year (FY) 2011

ultimately selected Aim Point 1 (T/R+1), Aim Point 2 (T/R+12), Mission Rehearsal Exercise (MRE) date (T/R+19) and Latest Arrival Date (LAD) (Available+1) for the purpose of tracking readiness. The alignment of model outputs to the selected ARFORGEN aim points and milestones requires post processing analysis to compare output fill percentages for both personnel and equipment to target fill percentages associated with the study team selected aim points and milestones.

For the FFG model, we also assigned the globally available rotational force units in the database to three Force Pools; Mission Force Pool (MFP), Rotational Force Pool (RFP) and Operational Sustainment Force Pool (OSFP). Each of these three force pools contain training cycles identified as Reset, Train/Ready (further divided into Train/Ready, Train/Ready 1, Train/Ready 2, Train/Ready 3 and Train/Ready 4), Available and Deployed in accordance with the requirements derived from FORSCOMs "US Army Force Generation Training Templates and Event Menu Matrices" briefing. Since the study team could not identify an authoritative source to determine a particular level of demand such as those described for ARFORGEN (e.g. steady state, surge and full surge), the team established three levels of demand as Low Demand (LD), Medium Demand (MD) and High Demand (HD) which are described in paragraph 2.1.1.4 above. All OF units in the database were assigned an R-Date (R=Reset) offset across a simulated 24 month FFG cycle to achieve an appropriate level of demand. For this study, the team built-in added rigor to the model by creating three FFG demand profiles, each 180 months in duration, which contained all three demand levels (LD, MD and HD) (See Table 7). The study team established the following business rules for the FFG demand profiles to add credibility and rationality to the model (See paragraph 2.1.1.4 and Figure 4 of the Executive Summary, above).

- o One cycle equals 24 months.
- o Corps HQs are designated in the Mission Force (MF) Pool only.
- o Simulation runs for 180 months or 7.5 cycles.
- o Model flexibility is executed in terms of high, medium and low demand (deployed) over the 180 months.
- o High demand = 15 x BCT, Medium demand = 6 x BCT, Low demand = 3 x BCT.
- o Demand for Division HQs and enablers (F/MF Bdes) are based on BCT demand requirements.
- o High, Medium and Low demand are sequential so one cycle cannot skip a demand level (e.g. High to Low).
- o Rotational Deployed units have a two consecutive cycles limit in order to maintain level readiness across the operational force.

Table 8. Demand Profiles

Profile 1 (1-2-2-1)					
Cycle 1 (LD)	Cycle 2 (MD)	Cycle 3 (MD)	Cycle 4 (HD)	Cycle 5 (HD)	Cycle 6 (MD)
3 x BCTs	6 x BCTs		15 x BCTs		6 x BCTs
Profile 2 (1-1-3-1)					
Cycle 1 (LD)	Cycle 2 (MD)	Cycle 3 (HD)	Cycle 4 (HD)	Cycle 5 (HD)	Cycle 6 (MD)
3 x BCTs	6 x BCTs	15 x BCTs			6 x BCTs
Profile 3 (1-1-4)					
Cycle 1 (LD)	Cycle 2 (MD)	Cycle 3 (HD)	Cycle 4 (HD)	Cycle 5 (HD)	Cycle 6 (HD)
3 x BCTs	6 x BCTs	15 x BCTs			

2.4 The Force Generation Resourcing Model (FGRM)

Ultimately the FGRM evolved as a tool to help address three separate but related analytic questions:

1. What are the short, medium and long term Enterprise-level impacts of applying the ARFORGEN model under surge levels of demand for Army conventional forces?
2. What are the short, medium and long term Enterprise-level impacts of the demand for individual augmentees (IAs) and equipment to fill joint manning document (JMD) and augmentation TDA spaces tasked to the Army for theater specific non-standard units and security force assistance missions?
3. What are the short, medium and long term Enterprise-level impacts of end strength reductions, force structure changes, and "in stride" transition from ARFORGEN to a modified Future Force Generation model?

Rather than reinvent the wheel, the study team opted to build on the latest iteration of the model developed for the earlier Irregular Warfare Demand Signals (IWDS) model. Given the model's focus on executing the force generation process as the primary driver to compute future demand for manpower and equipment, we chose to name it the Force Generation Resourcing Model. The FGRM integrates several enhancements to previously developed model functionality and attributes. Some minor structural and coding updates were required to model key aspects of the Future Force Generation (FFG) model but this was mainly a data driven effort. The data developed comprised the new demand cycles along with their fill targets. The model now allows the assignment of the FFG demand cycles assigned by unit and can also flag certain units for drawdown in order to track the reduction in forces.

More data collection was required to load modified ABCT and IBCT MTOEs reflecting addition of a 3rd CAB as well as UIC assignments and unit location data. From previous analyses it was also decided to enable the analyst to input separate attrition rates for MOSs and LINs rather than just specifying an overall resource attrition rate.

The majority of the software enhancements in this release were the addition of a web interface in addition to the standalone command-line version. The web interface allowed for better reporting.

The use of a Business Intelligence (BI) server was also explored. This allowed for charts and reports to be interactive and drilled into. Figure 8 below is a pie chart of the MOSs & LINs included in an analysis. The user can click on the pie chart or table to drill further into the data.
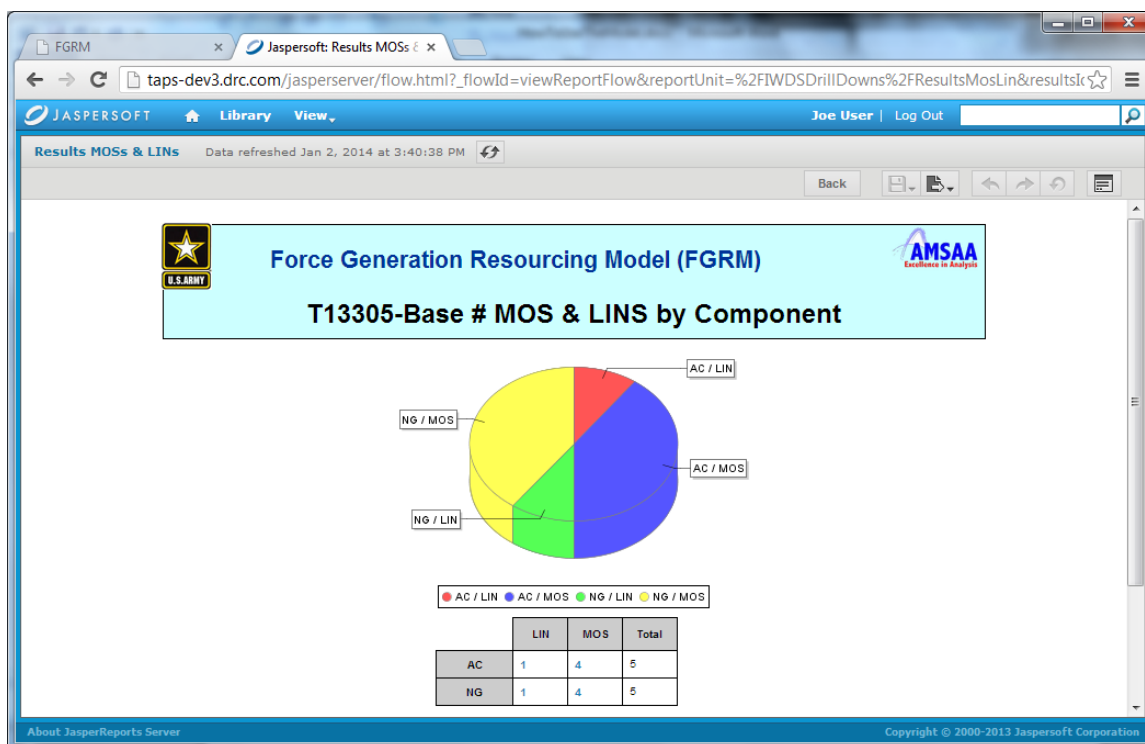
Figure 8. Example BI Report

3. SUMMARY OF RESULTS, CONCLUSIONS AND RECOMMENDATIONS

This Army study of Force Reduction impacts on the ability to resource operational forces resulted in an executable model that enables analysts to rapidly generate and compare monthly demand profiles across multiple vignettes for personnel and equipment categories 72 months into the future and beyond. The study began as a follow-on effort to the Irregular Warfare Demand Signals (IWDS) study completed in FY2012. Simply put, this effort sought to expand the model capabilities to demonstrate its value to the Army Enterprise with the ability to project future demand for resources using either the ARFORGEN or evolving FFG process. Additional expanded capabilities include multiple input ribbon criterions containing differing demand spectrum conditions and the added ability to analyze output data by geographic location, a tremendous aid for second destination shipping budgetary forecasting. Perhaps the most aggressive capability added is the Web Based Application of the model allowing the user to input various vignettes directly and generating automated output analysis and graphics.

As previously described, the model includes organizations from both the GF and OF and reflects the impacts of demand signals for personnel and equipment resources from all sources of supply over the course of 72 months and beyond. Additionally, the model replicates both the ARFORGEN and FFG aim points/manning targets in order to provide detailed impact analysis of potential shortfalls caused by demand. The results demonstrated the possibility to model resourcing of typical force structures over a wide range of boundary conditions, responsively, using non-proprietary, commercially available tools. Furthermore, the modeling approach is not tied to current cyclic ARFORGEN processes but can be adapted to FFG or whatever strategies the Army may choose to execute in the future.

Appendix A. Missions and Means Framework

Background on need for analytical support to Enterprise support of ARFORGEN. One of the primary missions of the institutional Army is generating trained and ready conventional ground forces to meet approved combatant commander (COCOM) and other joint and internal Army requirements. Accomplishing this mission is challenging under the best conditions and requires the capability to plan, organize, coordinate and execute a myriad of tasks that must be performed by the Army's Generating Force. For most of the past decade, the nation has been at war in two simultaneous ground campaigns and the Army has provided the bulk of the military forces engaged. Faced with high levels of sustained demand for conventional ground forces from Combatant Commanders and commanders in theater, the Army focused on the primary issue of sourcing units to meet the demand. It realized early on that 1] the nature of the conflicts in Iraq and Afghanistan would require an indefinite commitment of forces and 2] there would be constraints to limit unit deployment and contain the ground time for individual soldier boots. Therefore, the Army opted to organize around modular brigade combat teams and to develop and implement a rotational force generation process dubbed ARFORGEN. These initiatives proved effective for meeting the demand for forces and limiting unit and individual deployment durations. However the institutional Army processes and tools needed to man, equip, train and sustain Army operating forces were still geared to support Cold War era, non-rotational, tiered readiness force generation models. Consequently the institutional Army could not adequately generate an available distributable supply of manpower and equipment to meet the demand for resources from the available distributable supply of OF units moving through the ARFORGEN process, particularly those units in the Train/Ready phase as they prepare for their next mission/deployment. HQDA and U.S. Army Forces Command (FORSCOM) were forced into a reactionary process of directing the transfer of manpower and equipment from OF units further back in the ARFORGEN cycle (e.g., in Reset or early in Train/Ready) and from non-rotational OF units and GF units to units nearing their Mission Rehearsal Exercise (MRE) and/or Latest Arrival Date (LAD) dates. Army senior leaders worried about the danger of breaking the Army as Dwell time between deployments for many units and soldiers shrank and Reset processes for equipment lagged behind demand to support training on mission essential tasks. This ongoing situation led to a 2009 plea from the then Director of the Army Enterprise Task Force (now known as the Office of Business Transformation (OBT)), LTG Durbin, for analytical support to help develop an holistic, enterprise – level analytical capability to improve institutional Army support to the ARFORGEN process.

Connection to the MMF. The Missions and Means Framework (MMF) grew out of a desire to model the elements of military missions and relationships within and between them in order to better understand the impact of element variables on mission effectiveness. The AMSAA Technical Director proposed to apply key aspects of the MMF as needed to develop an analytical tool that could be used to compute monthly demands for manpower and equipment and unit fill rates based on unit sourcing plans (a.k.a., Ribbon Charts), representative starting conditions (e.g., unit personnel and

equipment strengths, unit positions in the ARFORGEN cycle at month 0, available distributable inventory of personnel and equipment from the Army enterprise, etc.) and business rules for ARFORGEN and Army resource prioritization. These output results could then be applied and further analyzed to identify understand potential readiness implications of alternative future scenarios involving parametric changes to demand for and supply of manpower and equipment from the institutional Army. This type of mission-based analysis could in turn be applied to justify Army inputs to the PPBES process to modify or develop capabilities needed to generate needed quantities of manpower and equipment categories.

The MMF offers a structured, disciplined WAY to understand and organize the MEANS available to the Army Enterprise so that senior leaders can:

- Understand the impact of the strategic environment on institutional adaptation goals
- Understand the role and inter-relationship of core enterprises (e.g., human capital and equipping core enterprises) to the Army enterprise and other core enterprises
- Analyze data in a structured, inter-related way to identify high payoff issues to focus on
- Make informed decisions that accomplish the desired ENDS (i.e. trained and ready forces to meet COCOM requirements) in the most efficient, cost-effective manner at lowest risk

When applied to specific missions and processes like the force generation mission and the ARFORGEN and other force generation processes, the generic MMF conceptual model (Figure 9 below) can be tailored to generate a detailed understanding of that mission/process.
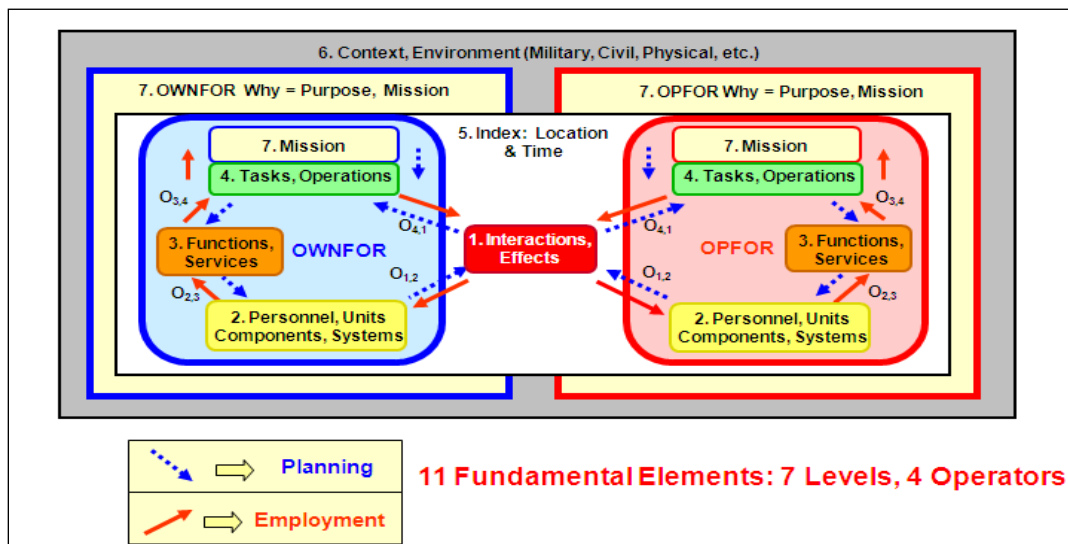
Figure 9. MMF conceptual model

Applying the framework properly drives the analyst to ask specific and detailed questions that form the basis for a comprehensive yet tightly focused data collection plan. Organizing and storing the resulting information in accordance with the MMF structure facilitates analysis and supports reuse for future analysis. Figure 10 below illustrates the application of the MMF to ask specific and detailed questions about application of ARFORGEN.

Data Categories	Operating Force Units	Army Enterprise/Generating Force
Purpose, Mission (MMF Level 7)	What is the desired end state and associated objectives?	What is the National Military Strategy and relevant Strategic Objectives? What are the DOD global force management requirements? What are the Army internal requirements?
Context, Environment (MMF Level 6)	What are the Political, Military, Economic, Social, Information, Infrastructure, Physical Environment and Time (PMESII-PT) factors affecting the mission?	What is the current and anticipated political, military, economic and social climate? What are the priorities for support?
Location & Time (MMF Level 5)	Where will my Area of Responsibility be? How much transition time will there be in theater before assuming responsibility?	What are the Time Phased Force Deployment details?
Operations, Tasks (MMF Level 4)	What are the Mission Essential Tasks (MET) for this mission? What are the supporting (lower level collective, leader, soldier, battlestaff) tasks for each MET? What conditions will impact tasks? What are associated MoE's and MoP's?	What enterprise level tasks must be performed to generate required capability packages? What conditions will impact? When are capability packages required? What is the minimum acceptable readiness level of capability package components/forces?
Function, Capability (MMF Level 3)	What capability packages are required to meet or exceed MoE's and MoP's given expected conditions?	What functions are needed to support identified enterprise level tasks? What capability packages (groups of functions) are required to achieve force generation goals?
Force, Component (MMF Level 2)	What force packages are needed to generate required capability packages? (i.e. battalion task force, company team, CA Team) What components? (i.e. MRAPs, M1s, 11B10, 35D20, MHE, ROWPU)	What resources are available within the Army Enterprise and what functions do they currently provide? What is their capacity? How can they be assembled to provide required capability packages?

Figure 10. Questions generated through MMF application

The MMF structure helps to look at the resulting data in a structured, inter-related way to identify critical areas and deficiencies versus trivial areas. Shown below is a simple ARFORGEN vignette that illustrates how resource demands are generated by Operating Force units at the beginning of the ARFORGEN cycle.

ILLUSTRATIVE VIGNETTE

Example Requirement Slice: Armor Brigade Combat Team (ABCT) entering Reset phase at 35% strength. The BCT commander identifies critical needs as: 100 junior enlisted infantry soldiers (MOS 11B10) and 2 field artillery majors (MOS 13A00O4); 150 M16A2 rifles and 20 MK19 automatic grenade launchers; and, counseling services for up to 150 soldiers with potential Post Traumatic Stress Disorder (PTSD).

How does the Institutional Army satisfy the requirement? Figure 11 below illustrates how the data and data relationships emerging from application of the MMF can be captured and organized to support analysis as well as development and integration of analytical tools.
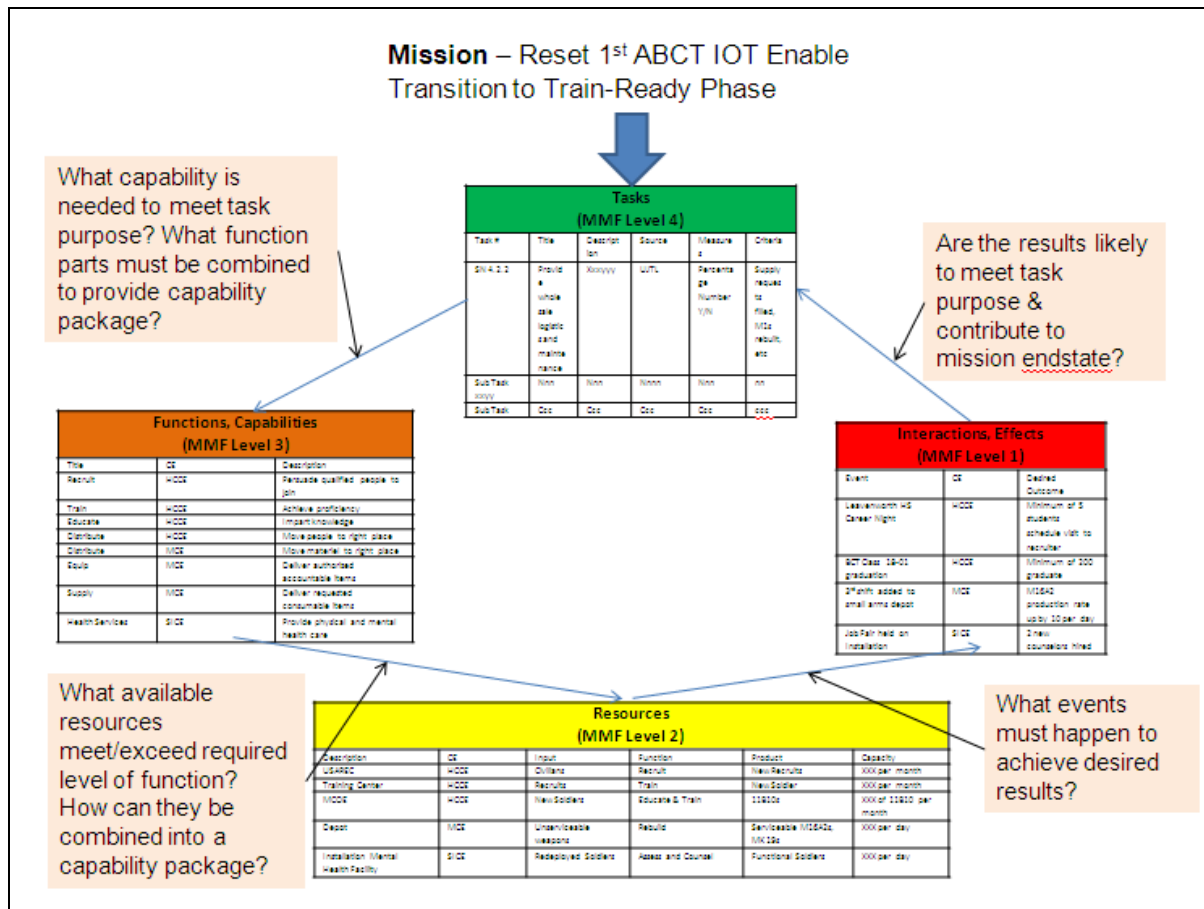
Figure 11. Organization of resulting data

Appendix B. A Rigorous Way to Reason About Force Generation Effectiveness

If the primary purpose of Army force generation is to generate trained and ready conventional ground forces, then there are two critical questions that must be kept in mind by the Army Enterprise: Ready for what?; and, Ready when?

Ready for what? The answer seems obvious. Ready for the next mission, of course. OF units preparing for their next deployment must have the personnel and equipment they need to be able to execute the mission they will assume upon arrival in theater. There are also some key readiness milestones that OF units need to achieve as they prepare for their next deployment or assigned mission during the Train/Ready phase of ARFORGEN or the Future Force Generation (FFG) model. Commanders of the modular BCTs, Multi-functional Brigades and Functional Brigades and their subordinate commanders need the correct types and amounts of personnel, equipment and training resources to achieve the training objectives associated with their mission essential tasks.

Ready when? OF units progressing through the force generation process have a detailed training plan and calendar describing the scheduled training events that they will use to achieve their training objectives. Having the right number and type of personnel and equipment to achieve the target level of proficiency for that training event is essential. It is also essential that the personnel on hand for the collective training events remain and deploy with the unit.

These two points guided the study and design of the FGRM tool. We worked off the premise that the best way for the Army Enterprise to provide support to ARFORGEN and/or the FFG is to generate sufficient amounts of the right types of personnel and equipment at the right time. The objective is to have enough supply available for distribution through Institutional Army processes to satisfy demand signals from OF units progressing through the force generation process, while maintaining acceptable levels of risk for lower priority Generating Force (GF) and non-rotational OF units, without breaking the All Volunteer force.

To achieve this objective the Army Enterprise should anticipate future OF resource demand signals with enough specificity to generate an available distributable supply of resources to match OF demand signals when needed without creating excess supplies. An important component of this capability is enabling Army Senior Leaders to pose "what if" questions involving variables impacting supply (e.g., improving economy negatively impacts Army ability to meet accession goals) and demand (e.g., end strength reductions, force structure changes, theater force caps, troop surges, etc.).

With these things in mind we adopted a relatively simple approach to develop an effective analytical tool. Specifically we wanted to:

- Model the ARFORGEN and FFG process' in order to generate resource demand signals from all sources on a monthly basis for a period of at least 72 months.

- Track instances of individual MOS' entering dwell after returning from deployment; number of months remaining in the objective dwell period (i.e. 27 months for steady state demand); instances of dwell violation (i.e. individual assigned to a unit deploying before individual completes objective dwell period); and magnitude of dwell violations (i.e. difference between objective dwell period (27 months) and months of dwell completed before next deployment).

- Generate a monthly available distributable supply of personnel based on representative GF outputs (e.g., new supply from institutional training and professional military education and scheduled rotation of personnel) and individuals in lower priority units who have/will not complete objective dwell period.

- Generate a monthly available distributable supply of equipment based on representative GF outputs (e.g., new supply from acquisition/modernization and equipment reset).

- Allocate and distribute monthly available distributable supply of personnel and equipment to OF, GF and non-standard units in accordance with Army and the relevant force generation process (i.e., ARFORGEN or FFG) business rules.

- Compute and report resulting monthly percentage of fill (on hand/authorized) for each category of personnel and equipment in every unit with authorizations.

- Compare computed percentage of fill to the pre-determined target percentage of fill associated with readiness progression aim points (e.g., month 1 of Train/Ready phase).

- Compute and report monthly instances of individual MOS dwell violation and the associated magnitude of each dwell violation.

- Filter model run results to enable comparison, analysis and generation of graphics and reports.

- Modify starting conditions (e.g., starting strength for particular resource categories, monthly new supply quantities, etc.) and parameters (e.g., allow or disallow dwell busts) to respond to "what if" type questions.

This approach enabled the development of several key indicators of force generation effectiveness that may signal the need for more in-depth analysis. Key indicators include:

- The difference between the output percentage of fill and the target percentage of fill at key readiness progression aim points. Significant differences signal potential unit readiness issues if not addressed. Trends can point to a need to adjust institutional processes and/or identify and justify programming and budgeting actions needed to correct the anticipated imbalance.

- High frequency and/or large magnitude of dwell bust for particular personnel categories. This could indicate particular specialties with the greatest potential for burn out and personal and family problems due to frequent deployments. It could also indicate the need for force structure changes and/or cross leveling certain functions to other specialties.

- Residual supply. Consistent or consistently high numbers of residual supply of certain resource categories may be an indicator of excess supply. When combined with dwell bust trends it may also point toward specific force structure or resource generation imbalances.

The ribbon charts currently produced as an output of the force generation synchronization process provide a schedule of major training events and deployments that correspond to the readiness progression aim points for OF units. These aim points are associated with minimum readiness (P and S) levels for units progressing through the relevant force-generation cycle. By overlaying the model results for aim point months, analysts and decision makers can gauge force generation effectiveness and develop focused questions for further, more in-depth analysis.

Appendix C. Units Represented in the Database

The unit database contains a representation of both Operating Force (OF) and Generating Force (GF) units. OF units in the model database are listed in Table 9 below. All organizations are Modified Table of Organization and Equipment (MTOE) with exceptions noted as Table of Distribution and Allowance (TDA) (4 total) or Joint Manning Document (JMD) (13 total). Additionally, Reserve Component organizations are identified as (RC), all others are Active Component (AC).

Table 9. OF and NSU Units in database

CORPS (4[1])			
I CORPS			
III CORPS			
V CORPS[1]			
XVIII AIRBORNE CORPS			
DIVISION (18)			
82D AIRBORNE DIV	4TH INFANTRY DIV	38TH INFANTRY DIV (RC)	
101ST AIRBORNE DIV	1ST ARMORED DIV	42D INFANTRY DIV (RC)	
1ST CAVALRY DIV	3D INFANTRY DIV	34TH INFANTRY DIV (RC)	
2D INFANTRY DIV	10TH MOUNTAIN DIV	40TH INFANTRY DIV (RC)	
25TH INFANTRY DIV	36TH INFANTRY DIV (RC)	35TH INFANTRY DIV (RC)	
1ST INFANTRY DIV	28TH INFANTRY DIV (RC)	29TH INFANTRY DIV (RC)	
ABCT (25)			
1/1 CD[2,3]	2/1 AD	170TH INF BDE[1]	
2/1 CD	1/3 ID	1/34 ID (RC)	
3/1 CD[2,3]	2/3 ID[4]	81ST AR BCT (RC)	
1/2 ID	3/3 ID[3]	155TH AR BCT (RC)	
1/1 ID[3]	4/1 AD	30TH AR BCT (RC)	
3/4 ID[4]	4/1 CD[3,4]	278TH ACR (RC)	
2/1 ID	5/1 AD[1]	55TH BCT, 28TH ID (RC)	
1/4 ID	172D INF BDE[1]	116TH CAV BCT (RC)	
2/4 ID[2,3]			
IBCT (40)			
1/101 ABN DIV[2,3]	2/10 MTN DIV	86TH IBCT (RC)	39TH IBCT (RC)
2/101 ABN DIV[3]	1/10 MTN DIV	79TH IBCT (RC)	33D IBCT (RC)
3/101 ABN DIV	4/3 ID	48TH IBCT (RC)	53D IBCT (RC)
1/82 ABN DIV	4/101 ABN DIV[4]	27TH IBCT (RC)	116/29 ID (RC)
2/82 ABN DIV	3/10 MTN DIV[4]	2/28 ID (RC)	76TH IBCT (RC)
3/82 ABN DIV[2,3]	4/25 ID[2,3]	45TH IBCT (RC)	37TH IBCT (RC)
3/1 ID[3,4]	4/10 MTN DIV	29TH IBCT (RC)	56/36 ID (RC)
4/4 ID[3]	4/1 ID[4]	2/34 ID (RC)	50TH IBCT (RC)
3/25 ID	4/82 ABN DIV[4]	32D IBCT (RC)	72/36 ID (RC)
173D ABN BCT[2,3]	3/1 AD[4]	41ST IBCT (RC)	256TH IBCT (RC)

SBCT (9)	
1/1 AD[2,3]	1/25 ID
3/2 ID	2/2 ID
2 CR	56/28 ID (RC)
2/25 ID	3D ACR
4/7 ID[4] (formerly 4/2 ID)	
BATTLEFIELD SURVEILLANCE BDES (10)	
525TH BfSB	67TH BfSB (RC)
201ST BfSB	71ST BfSB (RC)
504TH BfSB	142D BfSB (RC)
219TH BfSB (RC)	560TH BfSB (RC)
297TH BfSB (RC)	58TH BfSB (RC)
FIRES BDES (14)	
212TH FiB[2,3]	197TH FiB (RC)
214TH FiB	65TH FiB (RC)
17TH FiB	115TH FiB (RC)
18TH FiB	138TH FiB (RC)
210TH FiB	142D FiB (RC)
41ST FiB	169TH FiB (RC)
75TH FiB	45TH FiB (RC)
COMBAT AVIATION BDES (20)H-M-E	
12TH CAB	40TH CAB (RC)
1ST CAB, 1AD	36TH CAB (RC)
1ST CAB, 1CD	82D CAB
2D CAB	1ST CAB, 1ID
35TH CAB (RC)	10TH CAB
38TH CAB (RC)	3D CAB
42D CAB (RC)	101ST CAB
28TH CAB (RC)	16TH CAB
34TH CAB (RC)	159TH CAB
29TH CAB (RC)	25TH CAB
MANEUVER ENHANCEMENT BDES (21)	
1ST MEB	130TH MEB (RC)
4TH MEB[2,3]	136TH MEB (RC)
303D MEB	157TH MEB (RC)
218TH MEB (RC)	141ST MEB (RC)
149TH MEB (RC)	196TH MEB (RC)
26TH MEB (RC)	204TH MEB (RC)
92D MEB (RC)	226TH MEB (RC)
301ST MEB (RC) [2,3]	158TH MEB (RC)
302D MEB (RC)	404TH MEB (RC)
110TH MEB (RC)	648TH MEB (RC)
111TH MEB (RC)	

SUSTAINMENT BDES (32)		
593D SUS BDE[2,3]	501ST SUS BDE	518TH SUS BDE (RC)
101ST SUS BDE	16TH SUS BDE[2,3]	77TH SUS BDE (RC)
82D SUS BDE	230TH SUS BDE (RC)	300TH SUS BDE (RC)
15TH SUS BDE	17TH SUS BDE (RC)	224TH SUS BDE (RC)
1ST SUS BDE	108TH SUS BDE (RC) [2,3]	371ST SUS BDE (RC)
4TH SUS BDE	38TH SUS BDE (RC)	36TH SUS BDE (RC)
3D SUS BDE[2,3]	113TH SUS BDE (RC)	55TH SUS BDE (RC)
7TH SUS BDE	96TH SUS BDE (RC)	304TH SUS BDE (RC)
10TH SUS BDE	369TH SUS BDE (RC)	321ST SUS BDE (RC)
43D SUS BDE	90TH SUS BDE (RC)	287TH SUS BDE (RC)
45TH SUS BDE	89TH SUS BDE (RC)	
AIR DEFENSE ARTILLERY BDES (7)		
31ST ADA	108TH ADA	
35TH ADA	164TH ADA (RC)	
69TH ADA	174TH ADA (RC)	
11TH ADA		
CHEMICAL BDES (3)		
48TH CHEM		
31ST CHEM (RC)		
415TH CHEM (RC)		
MILITARY POLICE (CID) (2)		
3D MP		
6TH MP		
THEATER AVN BDES/CMDS/GROUPS (9)		
244TH AVN BDE	63D AVN BDE (RC)	
164TH AVN GRP	66TH AVN CMD (RC)	
77TH AVN BDE (RC)	449TH AVN BDE (RC)	
204TH AVN GRP (RC)	11TH AVN CMD (RC)	
185TH AVN BDE (RC)		
SIGNAL BDES (13)		
516TH SIG	35TH SIG	
11TH SIG	7TH SIG	
106TH SIG	228TH SIG (RC)	
2D SIG	261ST SIG (RC)	
160TH SIG	359TH SIG (RC)	
93D SIG[2,3]	505TH SIG (RC)	
1ST SIG		
ORDNANCE (EOD) GROUPS (3)		
71ST EOD		
52D EOD		
111TH EOD (RC)		
MILITARY INTELIGENCE BDES (5)		

513TH MI			
66TH MI			
470TH MI			
501ST MI			
500 MI			
ENGINEER BDES (17)			
36TH ENG[2,3]	111TH ENG (RC)		
555TH ENG	35TH ENG (RC) [2,3]		
18TH ENG	16TH ENG (RC)		
20TH ENG	372D ENG (RC)		
130TH ENG	411TH ENG (RC)		
2D ENG	420TH ENG (RC)		
225TH ENG (RC)	926TH ENG (RC)		
176TH ENG (RC)	194TH ENG (RC)		
168TH ENG (RC)			
MEDICAL BDES (14)			
62D MED	8TH MED (RC)		
65TH MED	2D MED (RC)		
44TH MED	332D MED (RC)		
1ST MED[2,3]	176TH MED (RC)		
804TH MED (RC)	5TH MED (RC)		
307TH MED (RC)	139TH MED (RC)		
338TH MED (RC)	330TH MED (RC)		
REGIONAL SUPPORT GROUPS (46)			
201ST RSG (RC)	641ST RSG (RC)	207TH RSG (RC)	50TH RSG (RC)
256TH RSG (RC)	642nd RSG (RC)	208th RSG (RC)	635TH RSG (RC)
151ST RSG (RC)	643rd RSG (RC)	209th RSG (RC)	329TH RSG (RC)
198TH RSG (RC)	644th RSG (RC)	210th RSG (RC)	139TH RSG (RC)
734TH RSG (RC)	645th RSG (RC)	211th RSG (RC)	109TH RSG (RC)
272D RSG (RC)	646th RSG (RC)	226TH RSG (RC)	191ST RSG (RC)
42D RSG (RC)	647th RSG (RC)	213TH RSG (RC)	120TH RSG (RC)
143D RSG (RC)	648th RSG (RC)	653rd RSG (RC)	166TH RSG (RC)
347TH RSG (RC)	649th RSG (RC)	654th RSG (RC)	38TH RSG (RC)
115TH RSG (RC)	650th RSG (RC)	655th RSG (RC)	658TH RSG
561ST RSG (RC)	651st RSG (RC)	301ST RSG (RC)	
640TH RSG (RC)	652nd RSG (RC)	206TH RSG (RC)	
MILITARY POLICE BDES (12)			
42D MP	43D MP (RC)		
89TH MP	11TH MP (RC)		
16TH MP	300TH MP (RC)		
18TH MP	800TH MP (RC)		
8TH MP	290TH MP (RC)		
49TH MP (RC)	177TH MP (RC)		

CA BDES (10)	
304TH CA BRIGADE HHC (RC)	358TH CA BDE HHC (RC)
308TH CA BRIGADE HHC (RC)	360TH CA BDE HHC (RC)
321ST CA BRIGADE HHC (RC)	364TH CA BDE HHC (RC)
322D CA BRIGADE HHC	HHC, 361ST CA BRIGADE
354TH CA BDE HHC (RC)	HHC, 85TH CA BRIGADE
INFORMATION OPNS GRP (4)	
71ST INFORMATION OPERATIONS GROUP (RC)	
56TH INFORMATION OPERATIONS GROUP (RC)	
151ST INFORMATION OPERATIONS GROUP (RC)	
152D INFORMATION OPERATIONS GROUP (RC)	
SPACE BDE (1)	
1ST SPACE BRIGADE	
AAMDC (GMD) (4) Army Air and Missile Defense CMD	
32D ARMY AIR AND MISSILE DEFENSE CMD	
94TH ARMY AIR AND MISSILE DEFENSE CMD	
10TH ARMY AIR AND MISSILE DEFENSE CMD	
263D AIR DEFENSE ARTILLERY BDE (RC)	
TAMSG (5) Theater AVN Maint SPT GRP	
1100TH AVIATION GROUP (RC)	
1106TH AVIATION GROUP (RC)	
1107TH AVIATION GROUP (RC)	
1108TH AVIATION GROUP (RC)	
1109TH AVIATION GROUP (RC)	
TRANSITION TEAMS, ADVISE AND ASSIST AUGMENTATION TEAMS (4)	
U.S. ARMY IRAQ TRANSITION TEAM (TDA)	
U.S. ARMY AFGHANISTAN TRANSITION TEAM (TDA)	
ADVISE & ASSIST TDA (OEF) (TDA)	
ADVISE & ASSIST TDA (OIF) (TDA)	
JOINT MANNING DOCUMENTS (13)	
USF IRAQ (JO1372) (JMD)	
ALL OTHER COCOM HQs_NATO (JMD)	
CSTC-A (J01354) (JMD)	
CENTCOM CCC (JO131) (JMD)	
USF AFGHANISTAN (J01358) (JMD)	
CJTF 435 (JOO302, 306, 1340) (JMD)	
CENTCOM SOCCENT (J0133) (JMD)	
TF 5-35 (J01395) (JMD)	
AFGHAN ENGINEER DISTRICT (J01357) (JMD)	
OSC - IRAQ (J01373) (JMD)	
CJTF 101 (J01351) (JMD)	
JTF PALADIN (J01368) (JMD)	
JTF TRAUMA (J01392) (JMD)	

Notes:
[1] Only used for Vignettes 1 and 2
[2] Units inactivated during course of model run (Vignette 1)
[3] Units inactivated during course of model run (Vignette 2)
[4] Units inactivated during course of model run (Vignettes 3 and 4)

Generating Force units in the model database are listed in Table 10 below. All organizations listed are TDA with exceptions noted as MTOE (10 total). Additionally, RC organizations are identified as (RC), all others are AC.

Table 10. Generating Force units in the database

Generating Force Units (517)
10TH BATTALION 108TH REGIMENT (RC)
10TH BATTALION 80TH REGIMENT (RC)
10TH BATTALION 95TH REGIMENT (RC)
117TH REGIMENT - TENNESSEE ARNG RTI (RC)
11TH BATTALION 104TH REGIMENT (RC)
11TH BATTALION 108TH REGIMENT (RC)
11TH BATTALION 95TH REGIMENT (RC)
11TH BATTALION 98TH REGIMENT (RC)
122D REGIMENT - GEORGIA ARNG RTI (RC)
124TH REGIMENT - VERMONT ARNG RTI (RC)
12TH AVN BATTALION (MTOE)
136TH REGIMENT - TEXAS ARNG RTI (RC)
139TH REGIMENT - NORTH CAROLINA ARNG RTI (RC)
147TH REGIMENT - OHIO ARNG RTI (RC)
154TH REGIMENT - MISSISSIPPI ARNG RTI (RC)
166TH REGIMENT - PENNSYLVANIA ARNG RTI (RC)
183D REGIMENT - VIRGINIA ARNG RTI (RC)
189TH REGIMENT - OKLAHOMA ARNG RTI (RC)
1984TH U.S. ARMY HOSPITAL (RC)
199TH REGIMENT - LOUISIANA ARNG RTI (RC)
1ST BATTALION 304TH REGIMENT (RC)
1ST BATTALION 317TH REGIMENT (RC)
1ST BATTALION 320TH REGIMENT (RC)
1ST BATTALION 321ST REGIMENT (RC)
1ST BATTALION 323D REGIMENT (RC)
1ST BATTALION 329TH REGIMENT (RC)
1ST BATTALION 330TH REGIMENT (RC)
1ST BATTALION 334TH REGIMENT (RC)
1ST BATTALION 354TH REGIMENT (RC)
1ST BATTALION 355TH REGIMENT (RC)
1ST BATTALION 378TH REGIMENT (RC)
1ST BATTALION 389TH REGIMENT (RC)

1ST BATTALION 390TH REGIMENT (RC)
1ST BATTALION 391ST REGIMENT (RC)
1ST BATTALION 398TH REGIMENT (RC)
1ST BATTALION 414TH REGIMENT (RC)
1ST BATTALION 415TH REGIMENT (RC)
1ST BATTALION 417TH REGIMENT (RC)
1ST BATTALION 518TH REGIMENT (RC)
1ST BATTALION 95TH REGIMENT (RC)
1ST BATTALION, 289TH REGIMENT (RC)
1ST BATTALION, 309TH REGIMENT (RC)
1ST BATTALION, 311TH REGIMENT (RC)
1ST BATTALION, 338TH REGIMENT (RC)
1ST BATTALION, 347TH REGIMENT (RC)
1ST BATTALION, 364TH REGIMENT (RC)
1ST BN, 3D INF REGIMENT (MTOE)
1ST CIVIL AFFAIRS AND PSYCHOLOGICAL OPERATIONS TRNG BDE (RC)
1ST CYBER BRIGADE
1ST SQUADRON, 11TH ARMORED CAVALRY REGIMENT (MTOE)
200TH REGIMENT - ALABAMA ARNG RTI (RC)
205TH REGIMENT - WASHINGTON ARNG RTI (RC)
218TH REGIMENT - SOUTH CAROLINA ARNG RTI (RC)
223D REGIMENT - CALIFORNIA ARNG RTI (RC)
2291ST U.S. ARMY HOSPITAL (RC)
233D REGIMENT - ARKANSAS ARNG RTI (RC)
2D BATTALION 317TH REGIMENT (RC)
2D BATTALION 319TH REGIMENT (RC)
2D BATTALION 321ST REGIMENT (RC)
2D BATTALION 323D REGIMENT (RC)
2D BATTALION 330TH REGIMENT (RC)
2D BATTALION 334TH REGIMENT (RC)
2D BATTALION 354TH REGIMENT (RC)
2D BATTALION 377TH REGIMENT (RC)
2D BATTALION 378TH REGIMENT (RC)
2D BATTALION 379TH REGIMENT (RC)
2D BATTALION 389TH REGIMENT (RC)
2D BATTALION 397TH REGIMENT (RC)
2D BATTALION 398TH REGIMENT (RC)
2D BATTALION 399TH REGIMENT (RC)
2D BATTALION 413TH REGIMENT (RC)
2D BATTALION 414TH REGIMENT (RC)
2D BATTALION 415TH REGIMENT (RC)
2D BATTALION 417TH REGIMENT (RC)
2D BATTALION 485TH REGIMENT (RC)
2D BATTALION, 290TH REGIMENT (RC)

2D BATTALION, 309TH REGIMENT (RC)
2D BATTALION, 310TH REGIMENT (RC)
2D BATTALION, 311TH REGIMENT (RC)
2D BATTALION, 312TH REGIMENT (RC)
2D BATTALION, 338TH REGIMENT (RC)
2D BATTALION, 340TH REGIMENT (RC)
2D BATTALION, 345TH REGIMENT (RC)
2D BATTALION, 346TH REGIMENT (RC)
2D BATTALION, 347TH REGIMENT (RC)
2D BATTALION, 348TH REGIMENT (RC)
2D BATTALION, 361ST REGIMENT (RC)
2D BATTALION, 364TH REGIMENT (RC)
2D BATTALION, 381ST REGIMENT (RC)
2D BATTALION, 383D REGIMENT (RC)
2D SQUADRON, 11TH ARMORED CAVALRY REGIMENT (MTOE)
3274TH U.S. ARMY HOSPITAL AUGMENTATION (RC)
3D BATTALION 304TH REGIMENT (RC)
3D BATTALION 318TH REGIMENT (RC)
3D BATTALION 321ST REGIMENT (RC)
3D BATTALION 323D REGIMENT (RC)
3D BATTALION 334TH REGIMENT (RC)
3D BATTALION 378TH REGIMENT (RC)
3D BATTALION 385TH REGIMENT (RC)
3D BATTALION 397TH REGIMENT (RC)
3D BATTALION 398TH REGIMENT (RC)
3D BATTALION 414TH REGIMENT (RC)
3D BATTALION 415TH REGIMENT (RC)
3D BATTALION 485TH REGIMENT (RC)
3D BATTALION 518TH REGIMENT (RC)
3D BATTALION, 289TH REGIMENT (RC)
3D BATTALION, 290TH REGIMENT (RC)
3D BATTALION, 309TH REGIMENT (RC)
3D BATTALION, 312TH REGIMENT (RC)
3D BATTALION, 330TH REGIMENT (RC)
3D BATTALION, 335TH REGIMENT (RC)
3D BATTALION, 337TH REGIMENT (RC)
3D BATTALION, 338TH REGIMENT (RC)
3D BATTALION, 339TH REGIMENT (RC)
3D BATTALION, 345TH REGIMENT (RC)
3D BATTALION, 346TH REGIMENT (RC)
3D BATTALION, 347TH REGIMENT (RC)
3D BATTALION, 348TH REGIMENT (RC)
3D BATTALION, 354TH REGIMENT (RC)
3D BATTALION, 360TH REGIMENT (RC)

3D BATTALION, 361ST REGIMENT (RC)
3D BATTALION, 363D REGIMENT (RC)
3D BATTALION, 381ST REGIMENT (RC)
3D BATTALION, 383D REGIMENT (RC)
4005TH U.S. ARMY HOSPITAL AUGMENTATION (RC)
4204TH U.S. ARMY HOSPITAL (RC)
4215TH U.S. ARMY HOSPITAL (RC)
4224TH U.S. ARMY HOSPITAL (RC)
4225TH U.S. ARMY HOSPITAL (RC)
426TH REGIMENT - WISCONSIN ARNG RTI (RC)
4960TH U.S. ARMY RESERVE SCHOOL (RC)
4TH BATTALION 108TH REGIMENT (RC)
4TH BATTALION 399TH REGIMENT (RC)
4TH BATTALION, 323D REGIMENT (RC)
4TH BATTALION, 413TH REGIMENT (RC)
4TH BATTALION, 518TH REGIMENT (RC)
4TH BN, 3D INF REGIMENT (MTOE)
5010TH U.S. ARMY HOSPITAL (RC)
5501ST U.S. ARMY HOSPITAL (RC)
58TH ENGINEER COMPANY (MTOE)
5TH BATTALION 100TH REGIMENT (RC)
6250TH U.S. ARMY HOSPITAL AUGMENTATION (RC)
6252D U.S. ARMY HOSPITAL (RC)
640TH REGIMENT - UTAH ARNG RTI (RC)
6TH BATTALION 100TH REGIMENT (RC)
6TH BATTALION 104TH REGIMENT (RC)
6TH BATTALION, 353D REGIMENT (RC)
704TH MILITARY INTELLIGENCE BRIGADE
707TH MILITARY INTELLIGENCE BATTALION
715TH MILITARY INTELLIGENCE BATTALION
717TH MILITARY INTELLIGENCE BATTALION
719TH MILITARY INTELLIGENCE BATTALION
7218TH U.S. ARMY MEDICAL SUPPORT UNIT (RC)
7223D USA MEDICAL SUPPORT UNIT (RC)
7226TH USA MEDICAL SUPPORT UNIT (RC)
7229TH USA MEDICAL SUPPORT UNIT (RC)
7233D USA MEDICAL SUPPORT UNIT (RC)
7238TH U.S. ARMY MEDICAL SUPPORT UNIT (RC)
79TH U.S. ARMY RESERVE SUSTAINMENT SUPPORT COMMAND (RC)
7TH BATTALION 100TH REGIMENT (RC)
7TH BATTALION 104TH REGIMENT (RC)
7TH BATTALION 108TH REGIMENT (RC)
7TH BATTALION 95TH REGIMENT (RC)
85TH U.S. ARMY RESERVE SUPPORT COMMAND (RC)

87TH U.S. ARMY RESERVE SUPPORT COMMAND (RC)
8TH BATTALION 100TH REGIMENT (RC)
8TH BATTALION 104TH REGIMENT (RC)
8TH BATTALION 108TH REGIMENT (RC)
8TH BATTALION 95TH REGIMENT (RC)
916TH SUPPORT BRIGADE (RC)
9TH BATTALION 104TH REGIMENT (RC)
9TH BATTALION 95TH REGIMENT (RC)
AKARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
ALABAMA MEDICAL DETACHMENT (RC)
ALARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
ARARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
ARNG OPERATIONAL SUPPORT AIRLIFT (RC)
ARNG TRAINING SITE CAMP SHELBY (RC)
ATTERBURY RESERVE FORCES ARNG TRAINING SITE (RC)
AZARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
BROOKE ARMY MEDICAL CENTER
CAARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
CALIFORNIA MEDICAL DETACHMENT (RC)
CAMP BLANDING ARNG TRAINING SITE (RC)
CAMP EDWARDS ARNG TRAINING SITE (RC)
CAMP GRAYLING ARNG TRAINING SITE (RC)
CAMP RIPLEY ARNG TRAINING SITE (RC)
CAMP ROBERTS ARNG TRAINING SITE (RC)
CARL R. DARNALL ARMY MEDICAL CENTER
COARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
CP ROBINSON INSTITUTE SUPPORT UNIT (RC)
CTARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
DCARNG AREA MOBILIZATION COMMAND (RC)
DCARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
DEARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
DEFENSE LANGUAGE INSTITUTE FOREIGN LANGUAGE CTR
DEFENSE THREAT REDUCTION AGENCY
DWIGHT DAVID EISENHOWER ARMY MEDICAL CENTER
FLARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
FLORIDA MEDICAL DETACHMENT (RC)
FORSCOM AUGMENTATION UNIT (RC)
GAARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
GROTON CT ACFT CLASSIFICATION AND REPAIR DEP (RC)
GUARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
HEADQUARTERS 5TH BRIGADE 75TH DIVISION (RC)
HHC AREA SUPPORT GROUP KUWAIT ARIFJAN
HHC, SEVENTH U.S. ARMY JOINT MULTINATIONAL TNG COMMAND
HHC, U.S. ARMY MEDICAL COMMAND

HHT, 11TH ARMORED CAVALRY REGIMENT (MTOE)
HIARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
HQ, 108TH TRAINING COMMAND (RC)
HQ, 120TH INFANTRY BRIGADE (RC)
HQ, 157TH INFANTRY BRIGADE (RC)
HQ, 158TH INFANTRY BRIGADE (RC)
HQ, 162D INFANTRY BRIGADE (RC)
HQ, 165TH INFANTRY BRIGADE (RC)
HQ, 166TH AVIATION BRIGADE (RC)
HQ, 171ST INFANTRY BRIGADE (RC)
HQ, 174TH INFANTRY BRIGADE (RC)
HQ, 177TH ARMORED BRIGADE (RC)
HQ, 188TH INFANTRY BRIGADE (RC)
HQ, 189TH INFANTRY BRIGADE (RC)
HQ, 191ST INFANTRY BRIGADE (RC)
HQ, 193D INFANTRY BRIGADE (RC)
HQ, 1ST BRIGADE, 75TH TRAINING DIVISION (RC)
HQ, 205TH INFANTRY BRIGADE (RC)
HQ, 2D BRIGADE, 70TH TRAINING DIVISION (RC)
HQ, 2D BRIGADE, 75TH TRAINING DIVISION (RC)
HQ, 3D BRIGADE, 75TH TRAINING DIVISION (RC)
HQ, 434TH FIELD ARTILLARY BRIGADE (RC)
HQ, 479TH FIELD ARTILLERY BRIGADE (RC)
HQ, 4TH BRIGADE, 75TH TRAINING DIVISION (RC)
HQ, 4TH CAVALRY BRIGADE
HQ, 5TH ARMORED BRIGADE
HQ, 72D FIELD ARTILLERY BRIGADE
HQ, 75TH TRAINING DIVISION (RC)
HQ, 78TH TRAINING DIVISION (RC)
HQ, 80TH TRAINING COMMAND (RC)
HQ, 84TH TRAINING COMMAND (RC)
HQ, 86TH TRAINING DIVISION (RC)
HQ, 91ST TRAINING DIVISION (RC)
HQ, 9TH MISSION SUPPORT COMMAND, USAR (RC)
HQ, FIRST ARMY
HQ, U.S. ARMY ALASKA
HQ, U.S. ARMY CADET COMMAND
IAARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
IDARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
ILARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
INARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
INARNG RECRUITING AND RETENTION BATTALION (RC)
KSARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
KYARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)

LAARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
MAARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
MADIGAN ARMY MEDICAL CENTER
MDARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
MEARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
MIARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
MIL DISTRICT OF WASHINGTON HQ (MTOE)
MNARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
MOARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
MSARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
MTARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
NDARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
NEARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
NHARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
NJARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
NMARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
NVARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
NYARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
OHARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
OHIO MEDICAL DETACHMENT (RC)
OKARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
ORARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
PAARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
PENNSYLVANIA MEDICAL DETACHMENT (RC)
PRARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
RIARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
SCARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
SCARNG RECRUITING AND RETENTION BATTALION (RC)
SDARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
STAFF AND FACULTY U.S. MILITARY ACADEMY
SUPPORT ELEMENT, ARMY RESERVE CAREERS DIVISION, OCAR (RC)
SUPPORT SQUADRON, 11TH ARMORED CAVALRY REGIMENT (MTOE)
TENNESSEE MEDICAL DETACHMENT (RC)
TEXAS MEDICAL DETACHMENT (RC)
TNARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
TRIPLER ARMY MEDICAL CENTER
TXARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
U.S. ARMY ELEMENT PACIFIC COMMAND HQ
U.S. ARMY ELEMENT SOUTHERN COMMAND HQ
U.S. ARMY ELEMENT U.S. EUROPEAN COMMAND HQ
U.S. ARMY ELM JOINT COMMUNICATIONS SUPPORT ELEMENT
U.S. ARMY ELM OFC OF THE JOINT CHIEFS OF STAFF
U.S. ARMY ELM OFFICE OF THE SECRETARY OF DEFENSE
U.S. ARMY EVALUATION CENTER

U.S. ARMY FORCES COMMAND HQ
U.S. ARMY INSTITUTE OF SURGICAL RESEARCH
U.S. ARMY LEGAL SERVICES AGENCY
U.S. ARMY MEDICAL ACTIVITY FT LEONARD WOOD
U.S. ARMY MEDICAL DEPARTMENT ACTIVITY ALASKA
U.S. ARMY MEDICAL DEPARTMENT ACTIVITY FT BENNING
U.S. ARMY MEDICAL DEPARTMENT ACTIVITY FT CAMPBELL
U.S. ARMY MEDICAL DEPARTMENT ACTIVITY FT CARSON
U.S. ARMY MEDICAL DEPARTMENT ACTIVITY FT EUSTIS
U.S. ARMY MEDICAL DEPARTMENT ACTIVITY FT HUACHUCA
U.S. ARMY MEDICAL DEPARTMENT ACTIVITY FT JACKSON
U.S. ARMY MEDICAL DEPARTMENT ACTIVITY FT KNOX
U.S. ARMY MEDICAL DEPARTMENT ACTIVITY FT LEAVENWORTH
U.S. ARMY MEDICAL DEPARTMENT ACTIVITY FT LEE
U.S. ARMY MEDICAL DEPARTMENT ACTIVITY FT POLK
U.S. ARMY MEDICAL DEPARTMENT ACTIVITY FT RILEY
U.S. ARMY MEDICAL DEPARTMENT ACTIVITY FT SILL
U.S. ARMY MEDICAL DEPARTMENT ACTIVITY FT STEWART
U.S. ARMY RECRUITING COMMAND HQ
U.S. ARMY WAR COLLEGE
U.S. ARMY ALLIED FORCES NORTHERN EUROPE BATTALION
U.S. ARMY ALLIED FORCES SHAPE BATTALION
U.S. ARMY ALLIED FORCES SOUTHERN EUROPE BATTALION
U.S. ARMY CHEMICAL SCHOOL
U.S. ARMY FIELD ARTILLERY SCHOOL
U.S. ARMY JOINT MULTINATIONAL READINESS CENTER
U.S. ARMY MEDICAL ACTIVITY HEILDELBERG
U.S. ARMY MEDICAL DEPARTMENT ACTIIVITY, BAVARIA
U.S. ARMY MILITARY POLICE SCHOOL
U.S. ARMY NATIONAL GROUND INTELLIGENCE CENTER
U.S. ARMY NATO HEADQUARTERS BRIGADE
U.S. ARMY ORDNANCE SCHOOL
U.S. ARMY CORRECTIONS COMMAND
U.S. ARMY CYBER COMMAND
U.S. ARMY DIRECTED MILITARY OVERSTRENGTH
U.S. ARMY GARRISON, WEST POINT
U.S. ARMY HUMAN RESOURCES COMMAND
U.S. ARMY MISSION SUPPORT ELEMENT, EIGHTH ARMY
U.S. ARMY RESERVE COMMAND AUGMENTATION UNIT (RC)
U.S. ARMY RESERVE DEPLOYMENT SUPPORT COMMAND (RC)
U.S. ARMY RESERVE DRILL SERGEANT SCHOOL (RC)
U.S. ARMY RESERVE SUSTAINMENT COMMAND (RC)
U.S. ARMY ACQUISITION SUPPORT CENTER
U.S. ARMY AIR DEFENSE ARTILLERY SCHOOL

U.S. ARMY ARMOR SCHOOL
U.S. ARMY ASYMMETRIC WARFARE GROUP
U.S. ARMY AVIATION CENTER OF EXCELLENCE
U.S. ARMY BAND (MTOE)
U.S. ARMY BRIGADE MODERNIZATION COMMAND
U.S. ARMY CAPABILITIES INTEGRATION CENTER
U.S. ARMY CENTRAL LOGISTICAL SUPPORT UNIT SINAI
U.S. ARMY CIVIL AFFAIRS AND PSYCHOLOGICAL OPNS CMD
U.S. ARMY COMBINED ARMS CENTER AND FT LEAVENWORTH
U.S. ARMY DEPUTY CHIEF OF STAFF, G-8
U.S. ARMY ELEMENT DEFENSE CONTRACT MANAGEMENT AGENCY
U.S. ARMY ELEMENT HDQS CENTRAL COMMAND
U.S. ARMY ELEMENT U.S. FORCES KOREA
U.S. ARMY ELEMENT, DEFENSE INFORMATION SYSTEMS AGENCY
U.S. ARMY ELEMENT, U.S. CYBER COMMAND
U.S. ARMY ENGINEER SCHOOL
U.S. ARMY EUROPE REGIONAL VETERINARY COMMAND
U.S. ARMY EUROPEAN REGIONAL DENTAL COMMAND
U.S. ARMY FIRES CENTER OF EXCELLENCE
U.S. ARMY FORT MEADE OPERATIONS CENTER
U.S. ARMY INFANTRY SCHOOL
U.S. ARMY INTELLIGENCE CENTER OF EXCELLENCE, FT HUACHUCA
U.S. ARMY JOINT READINESS TNG CEN OPS GROUP
U.S. ARMY LANDSTUHL REGIONAL MEDICAL CENTER
U.S. ARMY LOGISTICS UNIVERSITY
U.S. ARMY MANEUVER CENTER OF EXCELLENCE
U.S. ARMY MANEUVER SUPPORT CENTER OF EXCELLENCE
U.S. ARMY MEDICAL DEPARTMENT ACTIVITY FORT IRWIN
U.S. ARMY MEDICAL DEPARTMENT ACTY FT DRUM
U.S. ARMY MEDICAL DEPARTMENT CENTER AND SCHOOL FT S HOUS
U.S. ARMY MEDICAL RSCH INSTITUTE OF INFECTIOUS DISEASES
U.S. ARMY MISSION COMMAND TRAINING PROGRAM
U.S. ARMY NATIONAL TNG CEN OPERATIONS GROUP
U.S. ARMY NETWORK ENTERPRISE TECHNOLOGY COMMAND
U.S. ARMY NORTHERN REGIONAL DENTAL COMMAND
U.S. ARMY OFFICE OF THE DEPUTY CHIEF OF STAFF, G-3,5,7
U.S. ARMY OPERATIONAL TEST COMMAND
U.S. ARMY PACIFIC SUPPORT UNIT
U.S. ARMY PROTECTIVE SERVICE BATTALION CID
U.S. ARMY QUARTERMASTER CENTER AND SCHOOL
U.S. ARMY RANGER TRAINING BRIGADE
U.S. ARMY RECRUITING BATTALION ALBANY
U.S. ARMY RECRUITING BATTALION ATLANTA
U.S. ARMY RECRUITING BATTALION BALTIMORE

U.S. ARMY RECRUITING BATTALION BECKLEY
U.S. ARMY RECRUITING BATTALION CHICAGO
U.S. ARMY RECRUITING BATTALION CLEVELAND
U.S. ARMY RECRUITING BATTALION COLUMBIA
U.S. ARMY RECRUITING BATTALION COLUMBUS
U.S. ARMY RECRUITING BATTALION DALLAS
U.S. ARMY RECRUITING BATTALION DENVER
U.S. ARMY RECRUITING BATTALION GREAT LAKES
U.S. ARMY RECRUITING BATTALION HARRISBURG
U.S. ARMY RECRUITING BATTALION HOUSTON
U.S. ARMY RECRUITING BATTALION INDIANAPOLIS
U.S. ARMY RECRUITING BATTALION JACKSONVILLE
U.S. ARMY RECRUITING BATTALION KANSAS CITY
U.S. ARMY RECRUITING BATTALION LOS ANGELES
U.S. ARMY RECRUITING BATTALION MIAMI
U.S. ARMY RECRUITING BATTALION MID ATLANTIC
U.S. ARMY RECRUITING BATTALION MILWAUKEE
U.S. ARMY RECRUITING BATTALION MINNEAPOLIS
U.S. ARMY RECRUITING BATTALION MONTGOMERY
U.S. ARMY RECRUITING BATTALION NASHVILLE
U.S. ARMY RECRUITING BATTALION NEW ENGLAND
U.S. ARMY RECRUITING BATTALION NEW ORLEANS
U.S. ARMY RECRUITING BATTALION NEW YORK CITY
U.S. ARMY RECRUITING BATTALION OKLAHOMA CITY
U.S. ARMY RECRUITING BATTALION PHOENIX
U.S. ARMY RECRUITING BATTALION PORTLAND
U.S. ARMY RECRUITING BATTALION RALEIGH
U.S. ARMY RECRUITING BATTALION SACRAMENTO
U.S. ARMY RECRUITING BATTALION SALT LAKE CITY
U.S. ARMY RECRUITING BATTALION SAN ANTONIO
U.S. ARMY RECRUITING BATTALION SEATTLE
U.S. ARMY RECRUITING BATTALION SOUTHERN CALIFORNIA
U.S. ARMY RECRUITING BATTALION SYRACUSE
U.S. ARMY RECRUITING BATTALION TAMPA
U.S. ARMY RECRUTING BATTALION, FRESNO
U.S. ARMY RESERVE COMMAND SMALL ARMS READINESS GROUP (RC)
U.S. ARMY RESERVE ELEMENT, DEFENSE LOGISTICS AGENCY (RC)
U.S. ARMY RESERVE INFORMATION OPERATIONS COMMAND (RC)
U.S. ARMY RESERVE MEDICAL COMMAND (RC)
U.S. ARMY RESERVE SUPPORT COMMAND, FIRST ARMY (RC)
U.S. ARMY SECURITY ASSISTANCE TRAINING TEAMS
U.S. ARMY SERGEANTS MAJOR ACADEMY
U.S. ARMY SIGNAL CENTER OF EXCELLENCE
U.S. ARMY SOLDIER SUPORT INSTITUTE

U.S. ARMY SPECIAL FORCES COMMAND
U.S. ARMY SPECIAL OPERATIONS COMMAND
U.S. ARMY SPECIAL OPERATIONS COMMAND CENTRAL
U.S. ARMY SPECIAL OPERATIONS COMMAND SUPPORT UNIT
U.S. ARMY SUPPORT ELEMENT, KOREA
U.S. ARMY SUSTAINMENT COMMAND
U.S. ARMY TRAINING AND DOCTRINE COMMAND
U.S. ARMY TRAINING AND DOCTRINE COMMAND ANALYSIS CENTER
U.S. ARMY WESTERN REGIONAL DENTAL COMMAND
USA CENTER FOR HEALTH PROMOTION AND PREVENTIVE MEDICINE
USA COMBINED ARMS SUPPORT COMMAND & SUSTAINMENT COE
USA ELEMENT, JOINT POW MIA ACCOUNTING COMMAND
USA ELM, DEF INFO SYSTEMS AGCY, WHITE HOUSE COMM AGCY
USA JOHN F KENNEDY SPECIAL WARFARE CENTER AND SCHOOL
USA JOINT MULTINATIONAL TNG & EDUC DIRECTORATE
USA MEDICAL DEPARTMENT ACTIVITY U.S. MILITARY ACADEMY
USA MEDICAL DEPARTMENT ACTIVITY, FORT BELVOIR
USA MEDICAL DEPARTMENT ACTIVITY, FORT GEORGE G MEADE
USA SPECIAL OPERATIONS FIELD OPERATIONS ELEMENT
USA VETERINARY COMMAND
USAE DEFENSE MEDIA ACTIVITY
USAE JOINT INTEL CENTER
USAE U.S. SPECIAL OPERATIONS COMMAND
USAR AUGMENTATION, HQ, U.S. ARMY CENTRAL (RC)
USAR ELEMENT, 3100 STRATEGIC INTELLIGENCE GROUP (RC)
USAR ELEMENT, 3300 STRATEGIC INTELLIGENCE GROUP (RC)
USAR ELEMENT, CENTRAL COMMAND JOINT INTELLIGENCE CENTER (RC)
USAR ELEMENT, EUROPEAN COMMAND (RC)
USAR ELEMENT, EUROPEAN COMMAND JOINT ANALYSIS CENTER (RC)
USAR ELEMENT, HQ U.S. JOINT FORCES COMMAND (RC)
USAR ELEMENT, JOINT COMMUNICATIONS SUPPORT ELEMENT (RC)
USAR JOINT AND SPECIAL TROOPS SUPPORT COMMAND (RC)
USAR THEATER SIGNAL COMMAND SUPPORT UNIT, CENTCOM (RC)
USAR THEATER SIGNAL COMMAND SUPPORT UNIT, PACIFIC (RC)
USAR THEATER SUPPORT GROUP, PACIFIC (RC)
U.S. ARMY AVIATION LOGISTICAL SCHOOL
USARNG DATA PROCESSING UNIT (RC)
USARNG INST SUPPORT UNIT GOWENFIELD ID (RC)
UTARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
VAARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
VAARNG RECRUITING AND RETENTION BATTALION (RC)
VIARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
VTARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
W6TP INITIAL MIL TNG COE

W88U 7245 MEDICAL SUPPLY UNIT (RC)
W8DR 4220 USA HOSPITAL
W8GW ARNG MANEUVER TRNG CENTER (RC)
W8GX ARNG MANEUVER TRNG CENTER (RC)
W8K2 5502 USAR HOSP 1000B (RC)
W8K5 7220 USA MED SPT UNIT (RC)
W8LA 6253 USAR HSP 1000B (RC)
W900 MINNESOTA REC & RET (RC)
W901 MISSISSIPPI REC & RET (RC)
W902 MISSOURI REC & RET (RC)
W907 NEW JERSEY REC & RET (RC)
W909 NEW YORK REC & RET (RC)
W90A ALABAMA REC & RET (RC)
W90D ARKANSAS REC & RET (RC)
W90E CALIFORNIA REC & RET (RC)
W90K FLORIDA REC & RET (RC)
W90L GEORGIA REC & RET (RC)
W90Q ILLINOIS REC & RET (RC)
W90S IOWA REC & RET (RC)
W90U KENTUCKY REC & RET (RC)
W90V LOUISIANA REC & RET (RC)
W90Y MASSACHUSETTS REC & RET (RC)
W90Z MICHIGAN REC & RET (RC)
W913 LAARNG TRNG CTR, CP BEAUR (RC)
W91A NORTH CAROLINA REC & RET (RC)
W91C OHIO REC & RET (RC)
W91D OKLAHOMA REC & RET (RC)
W91F PENNSYLVANIA REC & RET (RC)
W91L WISCONSIN REC & RET (RC)
W91R TENNESSEE REC & RET (RC)
W91S TEXAS REC & RET (RC)
W92G OKARNG TRNG CTR, CP GRUBE (RC)
W92J PAARNG TRNG CTR, FT INDIA (RC)
W92Q TXARNG TRNG CTR, CP SWIFT (RC)
W92V WYARNG TRNG CTR, CP GUERN (RC)
WAARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
WALTER REED ARMY INSTITUTE OF RESEARCH
WALTER REED ARMY MEDICAL CENTER
WESTERN ARNG AVIATION TRAINING SITE (RC)
WESTERN HEMISPHERE INSTITUTE FOR SECURITY
WIARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)
WILLIAM BEAUMONT ARMY MEDICAL CENTER
WOMACK ARMY MEDICAL CENTER
WVARNG ELEMENT, JOINT FORCE HEADQUARTERS (RC)

Appendix D. Glossary of Acronyms and Terms

Section I – ACRONYMS

AAMDC (GMD)	Army Air and Missile Defense Command (Ground Missile Defense)
ABCT	Armor Brigade Combat Team
ABN DIV	Airborne Division
AC	Active Component
ACR	Armored Cavalry Regiment
AD	Armored Division
ADA	Air Defense Artillery
AMC	Army Materiel Command
AR	Army Regulation / Army Reserves
ARFORGEN	Army Force Generation
ARNG	Army National Guard
ARPL	Army Resource Priority List
ARSTAF	Army Staff
ASB	ARFORGEN Synchronization Board
ASCC	Army Service Component Command
AVN	Aviation
BCT	Brigade Combat Team
BDE	Brigade
BEB	Brigade Engineer Battalion
BfSB	Battlefield Surveillance Brigade
BN	Battalion
BOG	Boots on the Ground
CA	Civil Affairs
CAB	Combat Aviation Brigade
CAC	Combined Arms Center
CATS	Combined Arms Training Strategy
CBRN	Chemical, Biological, Radiological and Nuclear
CCDR	Combatant Commander
CD	Cavalry Division
CEF	Contingency Expeditionary Force
CHEM	Chemical
CID	Criminal Investigation Division
CJTF	Combined Joint Task Force
COCOM	Combatant Command
CONUS	Continental United States
CSTC-A	Combined Security Transition Command-Afghanistan
CTC	Combat Training Center
CTR	Center
DA	Department of the Army
DEF	Deployment Expeditionary Force
DIV	Division

DOD	Department of Defense
ENG	Engineer
EOD	Explosive Ordinance Disposal
FC	FORSCOM Circular
FFG	Future Force Generation
FM	Field Manual
FMSWeb	U.S. Army Force Management Support Agency's Force Management System Web Site
FORSCOM	**U.S. Army** Forces Command
FOUO	For Official Use Only
FT	Fort
FY	Fiscal Year
GCC	Ground Component Command
GF	Generating Force
HD	High Demand
HHC	Headquarters and Headquarters Company
HHT	Headquarters and Headquarters Troop
HQ	Headquarters
HQDA	Headquarters, Department of the Army
IAW	In Accordance With
IBCT	Infantry Brigade Combat Team
ID	Infantry Division
IO	Information Operations
IPR	In Progress Review
ISO	In Support Of
IW	Irregular Warfare
IWDS	Irregular Warfare Demand Signals
J2EE	Jave2 Platform Enterprise Edition
JDBC	Java Database Connectivity
JMD	Joint Manning Document
JTF	Joint Task Force
LAD	Latest Arrival Date
LD	Low Demand
LIN	Line Item Number
MCoE	Maneuver Center of Excellence
MD	Medium Demand
MEB	Maneuver Enhancement Brigade
MED	Medical
MEDCOM	U.S. Army Medical Command
MEEL	Mission Essential Equipment List
METL	Mission Essential Task List
MF	Mission Force
MFP	Mission Force Pool
MI	Military Intelligence
MNF-I	Multi-National Force-Iraq
MNT DIV	Mountain Division

MOS	Military Occupational Specialty
MP	Military Police
MRE	Mission Rehearsal Exercise
MS®	Microsoft®
MTOE	Modified Table of Organization and Equipment
NATO	North Atlantic Treaty Organization
NETCOM	Network Enterprise Technology Command
NG	National Guard
NSU	Non-Standard Unit
OEF	Operation Enduring Freedom
OF	Operating Force
OIF	Operation Iraqi Freedom
OPS	Operations
OS	Operational Sustainment
OSFP	Operational Sustainment Force Pool
OS (T1)	Operational Sustainment (Training Readiness Level 1)
OS (T2)	Operational Sustainment (Training Readiness Level 2)
OS (T3)	Operational Sustainment (Training Readiness Level 3)
OSC	Office of Security Cooperation
P&E	Personnel and Equipment
PK	Primary Key
QTY	Quantity
RC	Reserve Component
RD	Rotational Deployed
REC & RET	Recruiting and Retention
RFP	Rotational Force Pool
RND	Rotational Non-Deployed
RSG	Regional Support Command
SBCT	Stryker Brigade Combat Team
SCoE	Sustainment Center of Excellence
SDLC	Software Development Life Cycle
SIG	Signal
SOCCENT	Special Operations Command Central Command
SQL	Structured Query Language
SUS	Sustainment
TAB	Theater Aviation Brigade
TDA	Table of Distribution and Allowances
TF	Task Force
TNG	Training
TOE	Table of Organization and Equipment
T/R	Train/Ready
TRADOC	U.S. Army Training and Doctrine Command
TRNG	Training
UIC	Unit Identification Code
U.S.	United States
USF	United States Forces

USA	United States Army
USACIDC	U.S. Army Criminal Investigation Command
USAR	United States Army Reserve
USARC	U.S. Army Reserve Command
USARCENT	U.S. Army Central
USAREUR	U.S. Army Europe
USARNORTH	U.S. Army Northern
USARPAC	U.S. Army Pacific
USARSO	United States Army South
USASMDC	U.S. Army Space and Missile Command/Army Strategic Command
USASOC	United States Army Special Operations Command
USMA	United States Military Academy
USJFCOM	U.S. Joint Forces Command
VCSA	Vice Chief of Staff of the Army

Section II – TERMS

Army Force Generation
ARFORGEN is the structured progression of increased unit readiness over time to produce trained, ready, and cohesive units prepared on a rotational basis for operational deployment ISO the CCDR and other Army requirements.

Army Force Generation force pools
The force pools are an organizing construct that differentiates between relative readiness levels of rotational units and specifies unit activities over a three phase process.

Available Force Pool
The third force pool under ARFORGEN and FFG that includes those modular units that have been assessed as "Available" at designated capability levels (from training and readiness "gates") to conduct mission execution under any GCC.

Contingency Expeditionary Force
Army general purpose force units designated during the ARFORGEN synchronization process and given an AFPD in order to execute a contingency mission, operational plan or other Army requirement.

Deployment Expeditionary Force
Army general purpose force units assigned or allocated during the ARFORGEN synchronization process and given a LAD in order to execute assigned missions.

Force pool
Under ARFORGEN and Future Force Generation, rotational forces are grouped into force pools. Force pools are differentiated by the activities and capabilities of the units in each pool.

Future Force Generation
Evolving training model similar to ARFORGEN in structure however, the FFG provides more flexibility/adaptability to support current operations and unexpected contingencies.

Generating Force
The Generating Force consists of those Army organizations whose primary mission is to generate and sustain the Operational Army's capabilities for employment by joint force commanders (FM 1–01).

Line item number
A six-position alphanumeric number that identifies the generic nomenclature of specific types of equipment. Standard LIN consists of one alpha position followed by five numeric positions. Standard LIN are assigned by Army Materiel Command (AMC) and are listed in EM 0007.

Mission Force Pool
Consists of theater committed forces such as the 2nd Infantry Division Brigade Combat Team forward deployed in Korea.

Modification table of organization and equipment
An authorization document that prescribes the modification of a basic TOE necessary to adapt it to the needs of the specific unit or type of unit (AR 71–32).

Operational Sustainment Force Pool
Consists of units not allocated to planned operations or apportioned to contingency operations.

RESET Force Pool (Includes R1 and R2)
The initial force pool under ARFORGEN and FFG that begins with the establishment of a unit's Return Date. Units in the RESET force pool perform the following activities: Soldier-Family reintegration, block leave, unit reconstitution, changes of command, select individual training tasks, and receive new personnel and equipment. Units in the RESET force pool will not receive external (off installation) tasking without having exhausted all possible alternatives. However, units retain the capability to perform civil support operations or respond to GCC requirements (2009 ACP).

Rotational Force Pool
Consists of those units allocated for deployment or apportioned against a contingency plan.

Surge force

Selected contingency expeditionary force units in the Train/Ready Force Pool designated for emergent requirements or contingency operations.

Table of distribution and allowances

The authorization document that prescribes the organizational structure and the personnel and equipment requirements and authorizations of a military unit to perform a specific mission for which there is no appropriate TOE. An augmentation TOE is an authorization documentation document created to authorize additional personnel or equipment or both by an MTOE unit to perform an added peacetime or non-MTOE mission (AR 71–32).

Train-Ready Force Pool (Includes T/R 1 through T/R 4)

The second force pool under ARFORGEN and FFG that is between the RESET force pool and the Available force pool. Units in the Train-Ready force pool will increase training readiness and capabilities as quickly as possible given resource availability.

Appendix E. Personnel and Equipment (P/E) Types used in the Study Vignettes

The study team set out to demonstrate the ability to model monthly resource demands on the institutional Army over time intervals as long as 72 months using ARFORGEN and FFG ribbon charts for rotational operating force units and individual rotation schedules for non-rotational operating force, generating force and non-standard units. We incorporated HQDA manning and equipping guidance to develop an algorithm for prioritizing and allocating the supply of resources coming available each month. The model database includes all personnel and equipment categories listed in the MTOEs of operating force units and in the TDAs of generating force units. Because the sheer volume of data would overwhelm post processing analysis within the time constraints for this part of the project, we selected a limited number of resources that would be both manageable for presentation purposes and relevant. The personnel and equipment categories for model runs were selected using all categories contained within the three BCTs. Since vignettes 3 and 4 utilized recently published MTOEs which contained the reorganized BCTs above (see Appendix C, Tables 9 and 10), personnel and equipment categories differed slightly for those vignettes. Table 11 below describes the personnel and equipment categories in terms of unit type totals for the operating force units.

Table 11. Personnel and Equipment Category Totals by Unit Type

BCT Distribution			MOS V1&V2	MOS V3&V4	LIN V1&V2	LIN V3&V4
A	I	S	370	388	294	305
A	I		43	30	39	40
A		S	13	25	19	21
	I	S	28	29	22	15
ABCT only			98	108	77	56
IBCT only			34	40	26	45
SBCT only			89	62	52	34
Total			675	682	529	516
Note: A=Armor, I=Infantry, S=Stryker						

Appendix F. Additional Findings

In the process of developing vignette 3, we determined that location data would also be valuable to identify resource shortfalls or overages by geographic location. The study team coordinated with the FMSWeb help desk and the Defense Readiness Report System – Army (DRRS-A) office in order to compile the location data for all OF and GF units within the database. These offices were very helpful as the location data is not immediately associated with MTOE or TDA files from FMSWeb. The DRRS-A office provided the study team access to the database containing Unit Identification Code (UIC) associated with location code. This enabled us to match the unit (MTOE and TDA) data. As Army reorganization is much more complex than straight reduction of forces, location information contained in the model can greatly impact Second Destination Shipping projections over the course of the planned Army reorganization. As an example, Table 12, vignette 3 LIN Projection by Location below shows the projections (shortfall / overage) for three LINs (T13305: Tank, F60564: IFV and J22626: ICV) using vignette 3 base case (unconstrained) over the course of a 72 month run. Further, these charts describe those LIN projections using the three demand profiles shown in Table 8, paragraph 2.3. Also note that location data can be displayed by region, state, country or installation for both LINs and MOSs. As budgetary projections for Second Destination Shipping is critical, only LINs were used in the post processing example. Additionally, location data can also be extrapolated during post processing by specific unit as all location data is tied to each LIN and MOS.

Table 12. Vignette 3 LIN Projection by Location

V3 Profile 1 (12 MO Cycles)	LD	MD	MD	HD	HD	MD			
Active Component (BCTs) OCT 2017 Projections	T13305: Tank			F60564: IFV			J22626: ICV		
	Auth	O/H	+/-	Auth	O/H	+/-	Auth	O/H	+/-
Army (AC BCTs)	**1044**	**955**	**-89**	**1080**	**991**	**-89**	**903**	**822**	**-81**
Ft. Bliss, TX	174	166	-8	180	172	-8	129	123	-6
Ft. Hood, TX	261	231	-30	270	240	-30	129	110	-19
Ft. Lewis, WA							258	233	-25
Ft. Carson, CO	174	157	-17	180	163	-17			
Ft. Riley, KS	174	157	-17	180	163	-17			
Ft. Stewart, GA	87	74	-13	90	77	-13			
Ft. Benning, GA	87	83	-4	90	86	-4			
Korea	87	87	0	90	90	0			
Alaska							129	110	-19
Hawaii							129	123	-6
Germany							129	123	-6

V3 Profile 2 (12 MO Cycles)	LD	MD	HD	HD	HD	MD

Active Component (BCTs) OCT 2017 Projections	T13305: Tank			F60564: IFV			J22626: ICV		
	Auth	O/H	+/-	Auth	O/H	+/-	Auth	O/H	+/-
Army (AC BCTs)	**1044**	**964**	-80	**1080**	1000	-80	**903**	822	-81
Ft. Bliss, TX	174	157	-17	180	163	-17	129	123	-6
Ft. Hood, TX	261	240	-21	270	249	-21	129	110	-19
Ft. Lewis, WA							258	233	-25
Ft. Carson, CO	174	166	-8	180	172	-8			
Ft. Riley, KS	174	157	-17	180	163	-17			
Ft. Stewart, GA	87	74	-13	90	77	-13			
Ft. Benning, GA	87	83	-4	90	86	-4			
Korea	87	87	0	90	90	0			
Alaska							129	110	-19
Hawaii							129	123	-6
Germany							129	123	-6

V3 Profile 3 (12 MO Cycles)	LD	MD	HD	HD	HD	HD

Active Component (BCTs) OCT 2017 Projections	T13305: Tank			F60564: IFV			J22626: ICV		
	Auth	O/H	+/-	Auth	O/H	+/-	Auth	O/H	+/-
Army (AC BCTs)	**1044**	**964**	-80	**1080**	1000	-80	**903**	822	-81
Ft. Bliss, TX	174	157	-17	180	163	-17	129	123	-6
Ft. Hood, TX	261	240	-21	270	249	-21	129	110	-19
Ft. Lewis, WA							258	233	-25
Ft. Carson, CO	174	166	-8	180	172	-8			
Ft. Riley, KS	174	157	-17	180	163	-17			
Ft. Stewart, GA	87	74	-13	90	77	-13			
Ft. Benning, GA	87	83	-4	90	86	-4			
Korea	87	87	0	90	90	0			
Alaska							129	110	-19
Hawaii							129	123	-6
Germany							129	123	-6

Appendix G. Study Results

This study effort focused on development and refinement of a Force Generation Resourcing Model (FGRM) that can be handed off for use or further development to support the analytical needs of Army staff and/or Army Commands and Agencies working on enterprise level resourcing problems. We were not supporting a customer asking specific questions to drive the study and associated analytical findings. In fact the inability to locate an interested customer on the HQDA staff and the Army analytical community (notably CAA) to drive our analytical agenda and potentially adopt the FGRM was surprising. Ultimately we did receive a request from the Force Management Analysis Division of the Army G8 to take ownership of the model and associated products.

Lacking a set of externally provided analytical requirements, we determined to address questions provided at the end of the IWDS study by the then VCSA, GEN Chiarelli, concerning transition to a new force generation model. We also decided to examine the resourcing impact of end strength reductions and force structure changes announced in various high level Army policy and guidance announcements.

Consequently, the primary result of the study is the development of the FGRM and supporting enhancements. Model executables and supporting data sets along with a comprehensive user's guide were delivered separately to RAND.

Ideally most of the model inputs would be provided in the form of unit sourcing schedules (a.k.a., ribbon charts), starting conditions, and parameter values from authoritative sources on the Army staff or other customer organizations. For the purposes of this study, our team was forced to generate representative input data internally. This was a necessary but labor intensive and time consuming process for verifying and validating model functionality. Relatively little time was spent post-processing and analyzing the output data files from the model runs that were executed for each of the four vignettes. This was in sharp contrast to the earlier IWDS office where the VCSA was very interested in seeing analytical results. The remainder of Appendix G will describe the four analytical vignettes that were developed in greater detail and provide examples of analytic reports generated in graphical form for one complete system (the M1 Tank). It's important to note that similar results could be generated for all of the other systems (e.g., ground combat vehicles, rotary wing aircraft, radars, sensors, etc.) present in the Army's OF units.

Although the study team chose these four vignettes, the model provides a responsive automated capability to link operational demand for forces to manning and equipping supply requirements by quickly projecting the what, where, when and how much for a wide variety of situations out to 72 months and beyond in the future.

For vignettes 1 and 2, the study team began with a set of 'starting conditions' in order to set a baseline for follow-on model runs. The starting conditions were:

- Steady-state rotation - BOG:Dwell (1:3 for AC and 1:5 for RC organizations)[8]
- Army force generation capacity outputs of 1 Corps HQ, 4 Division HQs, 15 BCTs and 75K enablers based on steady-state demand level.[9]
- Model database populated with 882 organizations as described in Appendix C, Tables 9 and 10 and Figure 12 below.
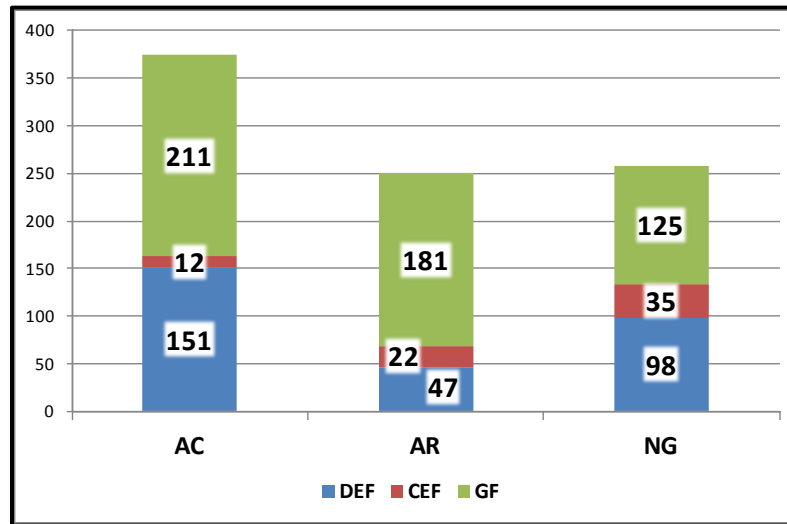
Figure 12. Units in database by component

The first vignette (**vignette 1**) was designed to describe the impacts on resources over time while reducing Army force structure in terms of AC BCT deactivations. As described in paragraph 2.2.1 above, the study team used the FY12 Army Posture Statement as a guide to determine how many and which types of AC BCTs to deactivate. Additionally, the study team deactivated 11 Support Brigades as a consequence of the BCT deactivations. See Figure 13 below which describes specific unit deactivation and the month (in simulation) that units was deactivated.

---

[8] AR 525-29, dtd 14 Mar 2011, para. 1-8a.

[9] AR 525-29, dtd 14 Mar 2011, para. 1-8b.

Unit Type	Comp	End Month	Draw down	Unit Name
ABCT	AC	10	true	HQ, 1ST BRIGADE COMBAT TEAM, 1ST CAVALRY DIVI
ABCT	AC	37	true	HQ, 2D BRIGADE COMBAT TEAM, 4TH INFANTRY DIVI
ABCT	AC	37	true	HQ, 3D BRIGADE COMBAT TEAM, 1ST CAVALRY DIVIS
SBCT	AC	43	true	HQ, 1ST BRIGADE COMBAT TEAM, 1ST ARMORED DIVI
IBCT	AC	10	true	HQ, 173D AIRBORNE BRIGADE COMBAT TEAM
IBCT	AC	10	true	HQ, 1ST BRIGADE COMBAT TEAM, 101ST AIRBORNE D
IBCT	AC	28	true	HQ, 3D BRIGADE COMBAT TEAM, 82D AIRBORNE DIVI
IBCT	AC	37	true	HQ, 4TH BRIGADE COMBAT TEAM, 25TH INFANTRY DI
FiB	AC	19	true	HHB, 212TH FIELD ARTILLERY BRIGADE
MEB	AC	28	true	HHC, 4TH MANEUVER ENHANCEMENT BRIGADE
SUS	AC	19	true	16TH SUSTAINMENT BRIGADE
SUS	AC	19	true	3D SUSTAINMENT BRIGADE
SUS	AC	28	true	593D SUSTAINMENT BRIGADE
ENG	AC	28	true	HHC, 36TH ENGINEER BRIGADE
SIG	AC	28	true	HHC, 93D SIGNAL BRIGADE
MED	AC	10	true	HHC, 1ST MEDICAL BRIGADE
MEB	AR	13	true	HHC, 301ST MANEUVER ENHANCEMENT BRIGADE
SUS	NG	37	true	108TH SUSTAINMENT BRIGADE
ENG	NG	61	true	HHC, 35TH ENGINEER BRIGADE

Figure 13. BCT and Support BDE Deactivations (Vignette 1)

This vignette was run using ARFORGEN with steady state demand level over a 72 month time period. Demand from rotational OF units was generated as a function of those units progressing through the ARFORGEN cycle from whatever point in the cycle they began at Simulation Month 0, (i.e. Reset + 3 months, or T/R + 9 months), to month 1 of the Available Phase (see Figure 14 below).

Figure 14. OF Rotational Unit R-Date Assignments

All units started with on hand (O/H) percentages equal to the ARFORGEN target percentage of fill for their starting point in the cycle (see Figure 15 below). Demand was determined by the difference between O/H inventory and new Target inventory levels. Demand from non-rotational OF and GF units was not generated because all of those units started with their target percentage of fill, which remains constant, and we did not factor in attrition for this vignette.

Figure 15. ARFORGEN Cycle Aim Points/Milestones

Vignette 1 was designed to determine the impact of end strength reductions and related force structure changes over a given period of time in terms of changes in the monthly demand for personnel and equipment. The study team used the FY12 Army Posture Statement as our authoritative resource to determine specific force reductions over a 72 month time period. This vignette also applied the ARFORGEN model under steady state level of demand as the underlying training benchmark in order to run all rotational operating force units across a 72 month cycle. As stated in paragraph 2.2.1., the final report above, vignette 1 force reductions are as follows in Figure 16:

Unit Type	Unit Name
ABCT	HQ, 1ST BRIGADE COMBAT TEAM, 1ST CAVALRY DIVISION
ABCT	HQ, 2D BRIGADE COMBAT TEAM, 4TH INFANTRY DIVISION
ABCT	HQ, 3D BRIGADE COMBAT TEAM, 1ST CAVALRY DIVISION
IBCT	HQ, 173D AIRBORNE BRIGADE COMBAT TEAM
IBCT	HQ, 1ST BRIGADE COMBAT TEAM, 101ST AIRBORNE DIVISION
IBCT	HQ, 3D BRIGADE COMBAT TEAM, 82D AIRBORNE DIVISION
IBCT	HQ, 4TH BRIGADE COMBAT TEAM, 25TH INFANTRY DIVISION
SBCT	HQ, 1ST BRIGADE COMBAT TEAM, 1ST ARMORED DIVISION
ENG	HHC, 35TH ENGINEER BRIGADE
ENG	HHC, 36TH ENGINEER BRIGADE
FiB	HHB, 212TH FIELD ARTILLERY BRIGADE
MEB	HHC, 302D MANEUVER ENHANCEMENT BRIGADE
MEB	HHC, 4TH MANEUVER ENHANCEMENT BRIGADE
MED	HHC, 1ST MEDICAL BRIGADE
SIG	HHC, 93D SIGNAL BRIGADE
SUS	108TH SUSTAINMENT BRIGADE
SUS	16TH SUSTAINMENT BRIGADE
SUS	3D SUSTAINMENT BRIGADE
SUS	593D SUSTAINMENT BRIGADE

Figure 16. Vignette 1 Force Reductions

The input ribbon chart detailed the specific month during the run for each unit to be deactivated. The deactivations were established to regulate an appropriate reduction in force over the 72 month period in order to maintain the required level of available forces in accordance with steady state demand requirements. The study team focused the post processing analysis on three major systems in terms of new supply requirements. The three systems were chosen because they are major combat systems for the BCTs. The system common names are the Tank, Stryker and Bradley of which, the Stryker and Bradley had shared resources (MOSs). Both vignette 1 and vignette 2 used comparative analysis and new supply results are shown below in Figures 17 and 18 following the vignette 2 description. Additionally, a base case was run in order to add context to both vignettes 1 and 2.

Vignette 2 was designed to determine the impact of *additional* force reductions over a given period of time in terms of resources. Again, the study team used the same parameters as was used for vignette 1 in terms of ARFORGEN and steady state demand requirements over a 72 month time period. The differences between vignette 1 and vignette 2 are an increased number of units being reduced and adding a combined arms battalion to the remaining active component BCTs. The study team created this vignette to align with the FY12 APS description of a 'potential' solution to enhance the capability of the remaining active component BCTs in order to account for the loss of capability from deeper BCT reductions. As

stated in paragraph 2.2.2. of the final report above, vignette 2 force reductions and reorganizations are as follows:

Unit Type	Unit Name
ABCT-12	HQ, 1ST BRIGADE COMBAT TEAM, 1ST CAVALRY DIVISION
ABCT-12	HQ, 2D BRIGADE COMBAT TEAM, 4TH INFANTRY DIVISION
ABCT-12	HQ, 1ST BRIGADE COMBAT TEAM, 1ST INFANTRY DIVISION
ABCT-12	HQ, 3D BRIGADE COMBAT TEAM, 3D INFANTRY DIVISION
ABCT-12	HQ, 4TH BRIGADE COMBAT TEAM, 1ST CAVALRY DIVISION
IBCT-12	HQ, 173D AIRBORNE BRIGADE COMBAT TEAM
IBCT-12	HQ, 1ST BRIGADE COMBAT TEAM, 101ST AIRBORNE DIVISION
IBCT-12	HQ, 3D BRIGADE COMBAT TEAM, 82D AIRBORNE DIVISION
IBCT-12	HQ, 4TH BRIGADE COMBAT TEAM, 25TH INFANTRY DIVISION
IBCT-12	HQ, 2D BRIGADE COMBAT TEAM, 101ST AIRBORNE DIVISION
IBCT-12	HQ, 3D BRIGADE COMBAT TEAM, 1ST INFANTRY DIVISION
IBCT-12	HQ, 4TH BRIGADE COMBAT TEAM, 4TH INFANTRY DIVISION
SBCT-12	HQ, 1ST BRIGADE COMBAT TEAM, 1ST ARMORED DIVISION
ENG	HHC, 35TH ENGINEER BRIGADE
ENG	HHC, 36TH ENGINEER BRIGADE
FiB	HHB, 212TH FIELD ARTILLERY BRIGADE
MEB	HHC, 302D MANEUVER ENHANCEMENT BRIGADE
MEB	HHC, 4TH MANEUVER ENHANCEMENT BRIGADE
MED	HHC, 1ST MEDICAL BRIGADE
SIG	HHC, 93D SIGNAL BRIGADE
SUS	108TH SUSTAINMENT BRIGADE
SUS	16TH SUSTAINMENT BRIGADE
SUS	3D SUSTAINMENT BRIGADE
SUS	593D SUSTAINMENT BRIGADE

Figure 17. Vignette 2 Force Reductions

Unit Type	Unit Name
ABCT-12	HEADQUARTERS, 5TH BRIGADE COMBAT TEAM, 1ST AR DIVISION
ABCT-12	HHC, 170TH INFANTRY BRIGADE
ABCT-12	HHC, 172D INFANTRY BRIGADE
ABCT-12	HQ, 1ST BRIGADE COMBAT TEAM, 3D INFANTRY DIVISION
ABCT-12	HQ, 1ST BRIGADE COMBAT TEAM, 4TH INFANTRY DIVISION
ABCT-12	HQ, 2D BRIGADE COMBAT TEAM, 1ST ARMORED DIVISION
ABCT-12	HQ, 2D BRIGADE COMBAT TEAM, 1ST CAVALRY DIVISION
ABCT-12	HQ, 2D BRIGADE COMBAT TEAM, 1ST INFANTRY DIVISION
ABCT-12	HQ, 2D BRIGADE COMBAT TEAM, 3D INFANTRY DIVISION

Unit Type	Unit Name
ABCT-12	HQ, 3D BRIGADE COMBAT TEAM, 1ST CAVALRY DIVISION
ABCT-12	HQ, 3D BRIGADE COMBAT TEAM, 4TH INFANTRY DIVISION
ABCT-12	HQ, 4TH BRIGADE COMBAT TEAM, 1ST ARMORED DIVISION
IBCT-12	HQ, 1ST BRIGADE COMBAT TEAM, 10TH MOUNTAIN DIVISION
IBCT-12	HQ, 1ST BRIGADE COMBAT TEAM, 82D AIRBORNE DIVISION
IBCT-12	HQ, 2D BRIGADE COMBAT TEAM, 10TH MOUNTAIN DIVISION
IBCT-12	HQ, 2D BRIGADE COMBAT TEAM, 82D AIRBORNE DIVISION
IBCT-12	HQ, 3D BRIGADE COMBAT TEAM, 101ST AIRBORNE DIVISION
IBCT-12	HQ, 3D BRIGADE COMBAT TEAM, 10TH MOUNTAIN DIVISION
IBCT-12	HQ, 3D BRIGADE COMBAT TEAM, 1ST ARMORED DIVISION
IBCT-12	HQ, 3D BRIGADE COMBAT TEAM, 25TH INFANTRY DIVISION
IBCT-12	HQ, 4TH BRIGADE COMBAT TEAM, 101ST AIRBORNE DIVISION
IBCT-12	HQ, 4TH BRIGADE COMBAT TEAM, 10TH MOUNTAIN DIVISION
IBCT-12	HQ, 4TH BRIGADE COMBAT TEAM, 1ST INFANTRY DIVISION
IBCT-12	HQ, 4TH BRIGADE COMBAT TEAM, 3D INFANTRY DIVISION
IBCT-12	HQ, 4TH BRIGADE COMBAT TEAM, 82D AIRBORNE DIVISION
SBCT-12	3D ARMOR CAVALRY REGIMENT
SBCT-12	HHC, 1ST BRIGADE COMBAT TEAM, 25TH INFANTRY DIVISION
SBCT-12	HHC, 2D BRIGADE COMBAT TEAM, 25TH INFANTRY DIVISION
SBCT-12	HHC, 2D BRIGADE COMBAT TEAM, 2D INFANTRY DIVISION
SBCT-12	HHC, 3D BRIGADE COMBAT TEAM, 2D INFANTRY DIVISION
SBCT-12	HHC, 4TH BRIGADE COMBAT TEAM, 2D INFANTRY DIVISION
SBCT-12	HHT, 2D CAVALRY REGIMENT

Figure 18. Vignette 2 Force Reorganizations

As stated earlier, vignettes 1 and 2 were analyzed comparatively against a base case run (base case did not include force reductions) by analyzing the new supply requirements over the 72 month run focused on the three major systems in the BCTs (Tank, Bradley and Stryker). As a sample, the following figures graphically depict the new supply projected requirements by month for MOSs and LIN's associated with the M1A2 and crew.
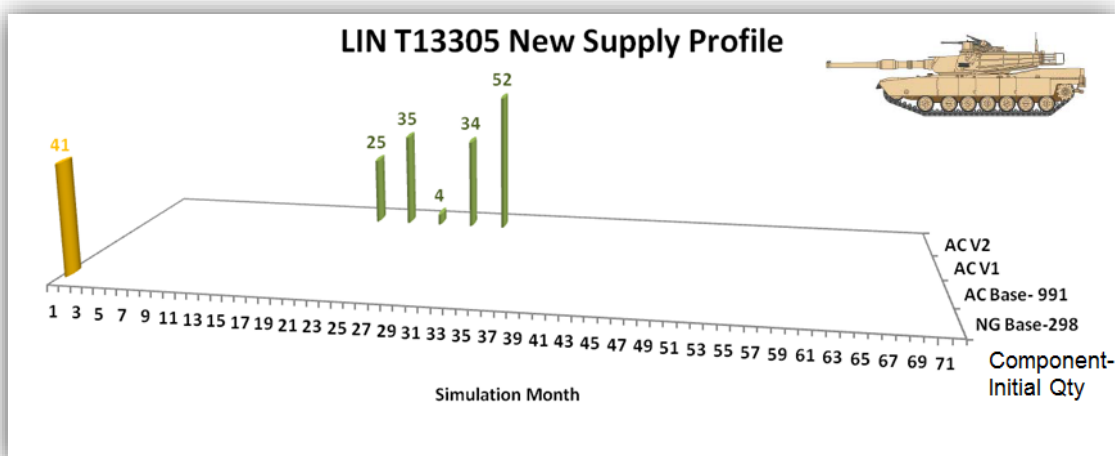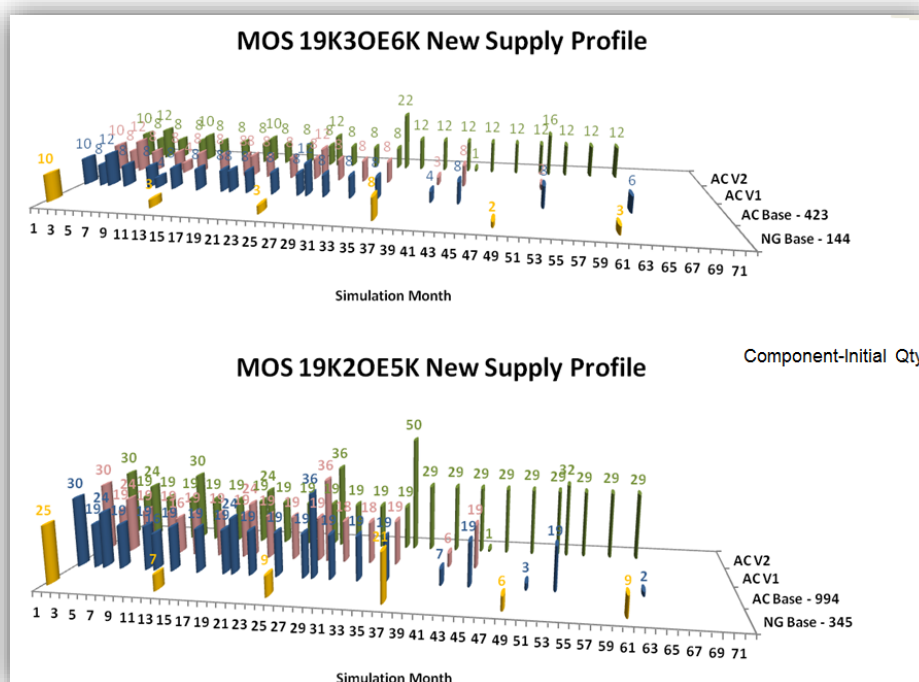
Figure 19. New Supply (Tank)

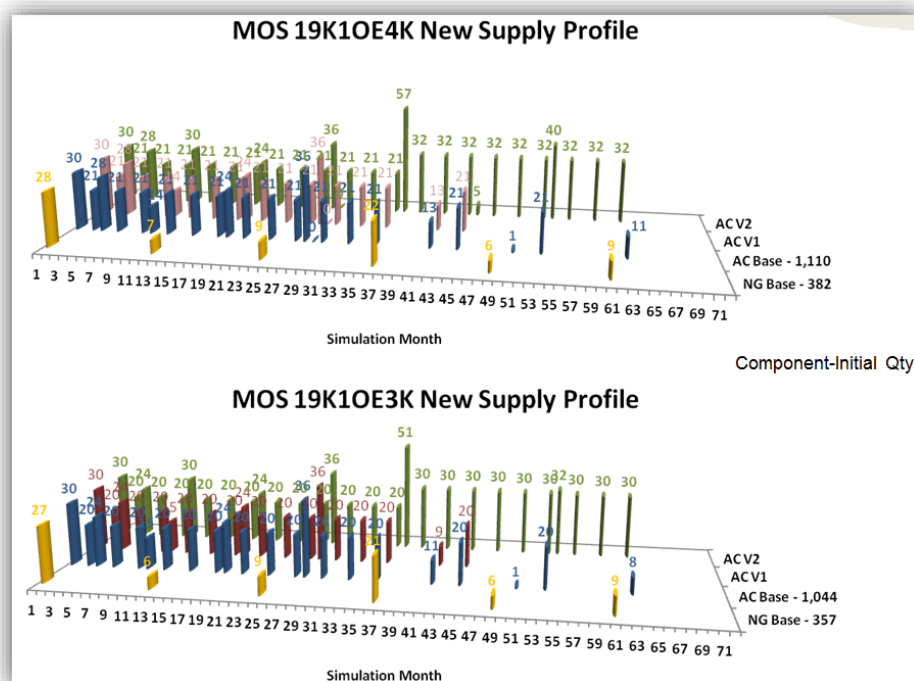**Figure 20. New Supply (MOS – Tank Crew E6/E5)**

Figure 21. New Supply (MOS – Tank Crew E4/E3)

Vignette 3 was created by incorporating the authoritative guidance provided by the FY13 Army reorganization plan announced by the Chief of Staff of the Army, GEN Raymond Odierno, on June 25, 2013. This plan solidified what the study team had been trying to determine from guidance provided by the FY 2012 APS regarding force reductions and reorganizations. As discussed previously, vignettes 1 and 2 reduced and reorganized BCTs over a 72 month ARFORGEN steady state period. With the Army reorganization plan announced, the study team had specific guidance as to how many, and which BCTs would be reduced as well as the precise make-up of the remaining, reorganized BCTs. Additionally, the study team was able to further develop and refine the emerging Future Force Generation model and incorporate those parameters into the Force Generation Resource Model (FGRM). Armed with this new information, the study team developed vignette 3 using both the Army Reorganization Plan as well as the evolving Future Force Generation model. The following input parameters were established for vignette 3.

- o Attrition Rates –5% overall (for personnel) and 1% for LINs.
- o Rotation Rates – Rotation rates (personnel) are as follows:
  - GF/TDA – 15% every 6 months.
  - RD/RND – 33.3% exiting Available/Deployed phases into the Reset phase
  - Korea – 80% of all MOSs annually.
  - NSUs – 33% every 3 months. NSUs will be used as placeholders, but not to influence the models outcome as in previous studies.
  - MF – 33.3% annually.

o RD personnel will be placed in the Dwell Bin and RND personnel will be placed in the Supply Pool when exiting Available/Deployed phases into the Reset phase.
o New Korea unit MTOEs have been developed and will be applied for V3.
o Complete BCT inactivation's will occur instantaneously as enhanced BCTs will reorganize instantaneously.
o V3 will minimize use of Reserve Component units in the RD force pool.

The following adjustments were made to the model unit data base in accordance with the new Army Reorganization Plan.

o BCT changes (maintained from vignette 2 however, vignette 3 AC BCT MTOEs were available and downloaded from FMS Web).
   • Third maneuver battalion to A&I BCTs.
   • Recon Troop, Forward Support Company and intelligence-medical-support sections.
o Reconfigure/Rename the Brigade Special Troops Battalions (BSTB) within the A&I BCTs to Brigade Engineering Battalions (BEB). (Source: G/3/5/7 DAMO-FM)
   • Add Engineer Company (2 Combat Engineer Platoons, 1 Clearance Platoon).
   • Remove MP Platoons.
   • Signal and MI Company remain.
o Add Brigade Engineering Battalion to SBCTs. (Old SBCTs did not have a BSTB)
   • Same configuration as the BEB within A&I BCTs with Anti-Armor Company added.
o Enhance the Fires Battalions within BCTs from 2x8 to 3x6. (Source: FCoE, TCM BCT Fires)
   • ABCT, change from SP155 2x8 to SP155 3x6.
   • IBCT, change from Towed 105 2x8 to Towed 105 2x6 and Towed 155 1x6.
   • SBCT, no change from current Fires Battalion (Towed 105 3x6).

The input ribbon charts for vignette 3 became much more complex as for vignettes 1 and 2 since the evolving FFG model was used. The study team developed three levels of demand as described in paragraph 2.1.1.4. above and used all three for a singular model run over 180 months (see Figure 22). FFG cycle with three demand levels interspersed). Additionally, the team developed three separate demand 'profiles' in order to provide breadth and depth to the post processing analysis in comparative terms. Finally, the team executed the model runs for each demand profile in three runs of unconstrained to establish a base case, 25% and 50% degradation of new resource supply for additional comparative analysis. The ribbon charts were established to maintain an appropriate reduction in force over the 72 month period so as to prevent disruption while maintaining the required level of available forces in accordance with demand requirements. Figure 22 below displays the three demand profiles and associated units assigned by force pool for

each cycle (note: 1 cycle equals 12 months, table numbers indicate number of units).

Profile 1																		
Force Pool	Cycle 1 (LD)			Cycle 2 (MD)			Cycle 3 (MD)			Cycle 4 (HD)			Cycle 5 (HD)			Cycle 6 (MD)			
	AC	AR	NG	AC	AR	NG	AC	AR	NG	AC	AR	NG	AC	AR	NG	AC	AR	NG	
MF	12	0	0	12	0	0	12	0	0	12	0	0	12	0	0	12	0	0	72
RD	12	0	0	27	0	0	26	0	0	59	4	5	54	3	8	26	0	0	224
RND	112	0	1	94	0	2	93	6	7	57	7	16	62	10	12	90	3	10	582
OS (T1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OS (T2)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	2
OS (T3)	0	0	8	0	0	8	0	0	8	0	0	7	0	0	7	0	0	8	46
OS	0	67	116	0	67	115	0	61	110	0	56	96	0	54	97	0	64	107	1010
Total			328			325			323			320			320			320	1936

Profile 2																		
Force Pool	Cycle 1 (LD)			Cycle 2 (MD)			Cycle 3 (HD)			Cycle 4 (HD)			Cycle 5 (HD)			Cycle 6 (MD)			
	AC	AR	NG	AC	AR	NG	AC	AR	NG	AC	AR	NG	AC	AR	NG	AC	AR	NG	
MF	12	0	0	12	0	0	12	0	0	12	0	0	12	0	0	12	0	0	72
RD	12	0	0	27	0	0	62	4	3	58	6	4	54	2	12	26	0	0	270
RND	112	0	1	94	4	5	57	8	9	58	10	19	62	8	9	90	2	13	561
OS (T1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OS (T2)	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	3
OS (T3)	0	0	8	0	0	8	0	0	7	0	0	7	0	0	7	0	0	8	45
OS	0	67	116	0	63	112	0	55	105	0	51	94	0	57	96	0	65	104	985
Total			328			325			323			320			320			320	1936

Profile 3																		
Force Pool	Cycle 1 (LD)			Cycle 2 (MD)			Cycle 3 (HD)			Cycle 4 (HD)			Cycle 5 (HD)			Cycle 6 (HD)			
	AC	AR	NG	AC	AR	NG	AC	AR	NG	AC	AR	NG	AC	AR	NG	AC	AR	NG	
MF	12	0	0	12	0	0	12	0	0	12	0	0	12	0	0	12	0	0	72
RD	12	0	0	27	0	0	61	4	3	58	4	6	55	4	9	61	2	5	311
RND	112	0	1	94	4	5	58	5	11	58	10	16	61	7	15	55	5	15	532
OS (T1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OS (T2)	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	4
OS (T3)	0	0	8	0	0	8	0	0	7	0	0	7	0	0	7	0	0	7	44
OS	0	67	116	0	63	112	0	58	103	0	53	95	0	56	93	0	60	97	973
Total			328			325			323			320			320			320	1936

Figure 22. Demand Profiles with Unit Distribution

Just like vignettes 1 and 2, the study team focused the post processing analysis on three major systems in terms of new supply requirements. The three systems were chosen because they are major combat systems for the BCTs. The system common names are the Tank, Stryker and Bradley of which, the Stryker and Bradley had shared resources (MOSs). The study team used comparative analysis focused on projected new supply requirements beginning with an unconstrained

model run, the base case, and two additional constrained model runs with a decrement of new supply at 25% (C75) and 50% (C50). The results are shown below in Figures 23 through 27. Also note that the three profiles are not distinguished since the post processing analysis show insignificant data comparison. Also note that only the Tank system is shown as the other systems showed very similar trends.
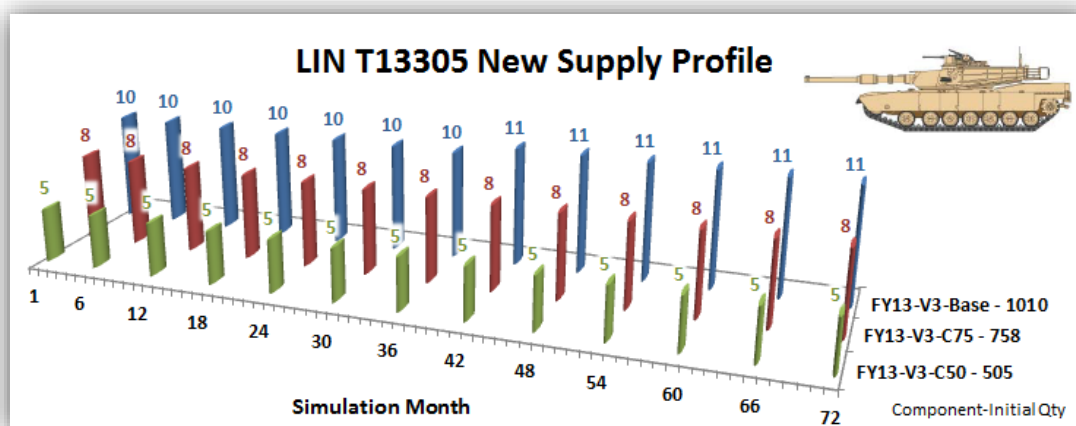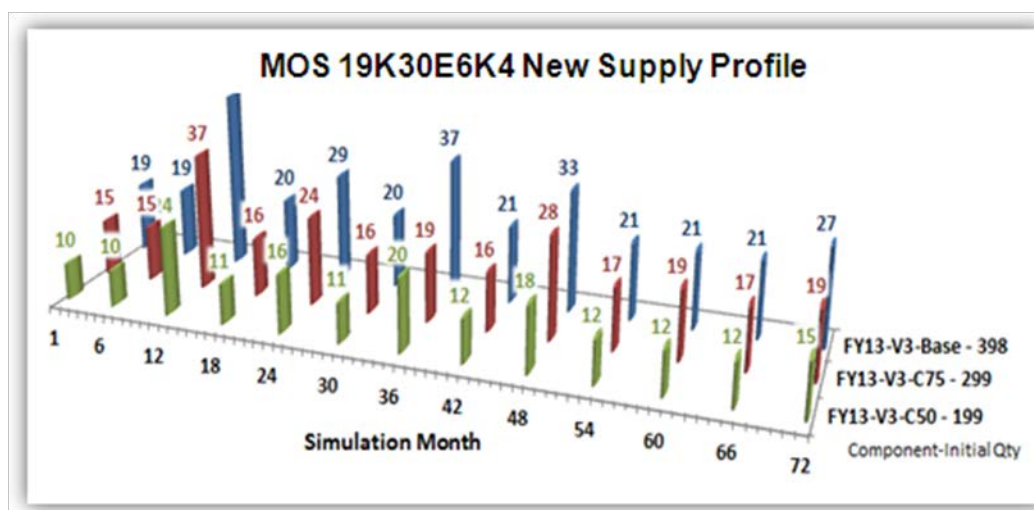

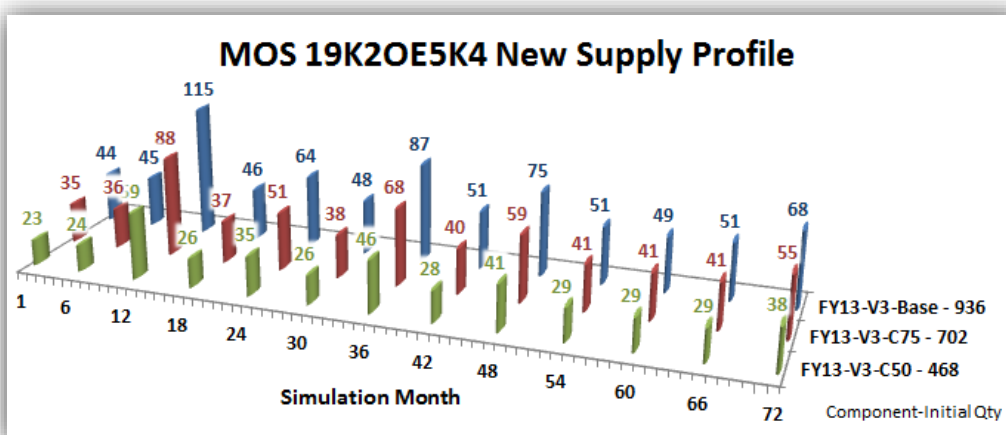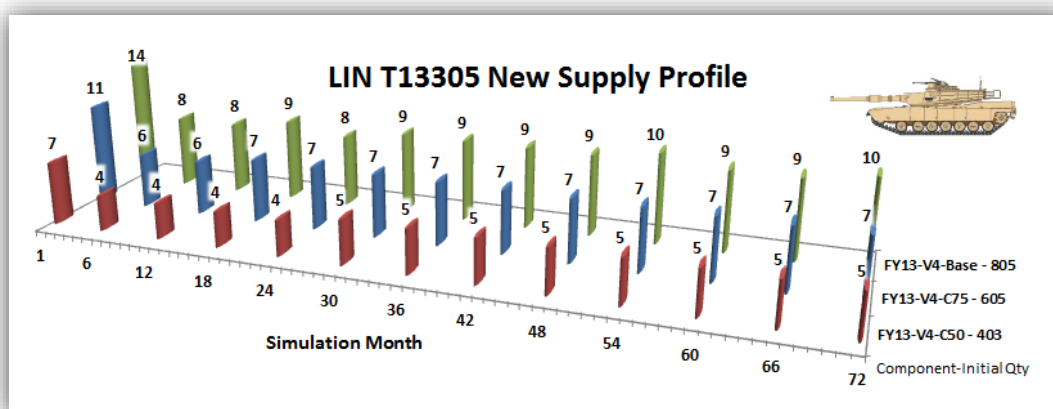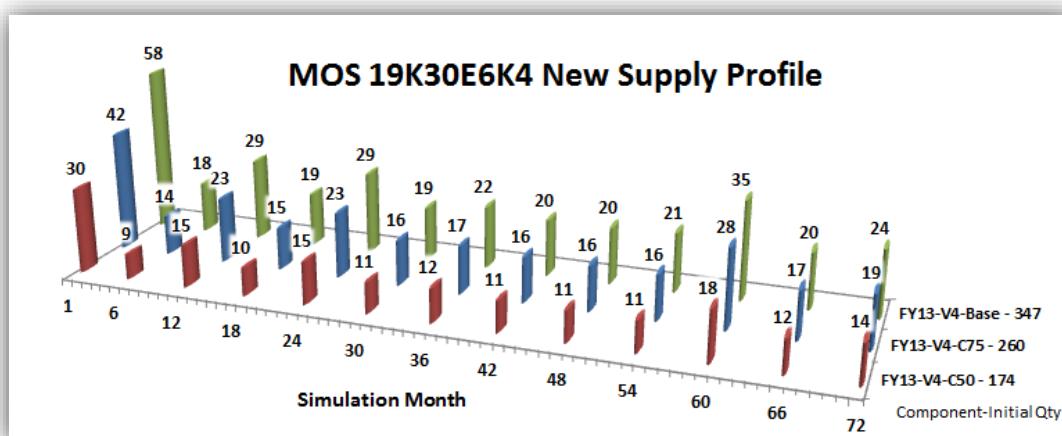**Figure 23. New Supply (Tank)**

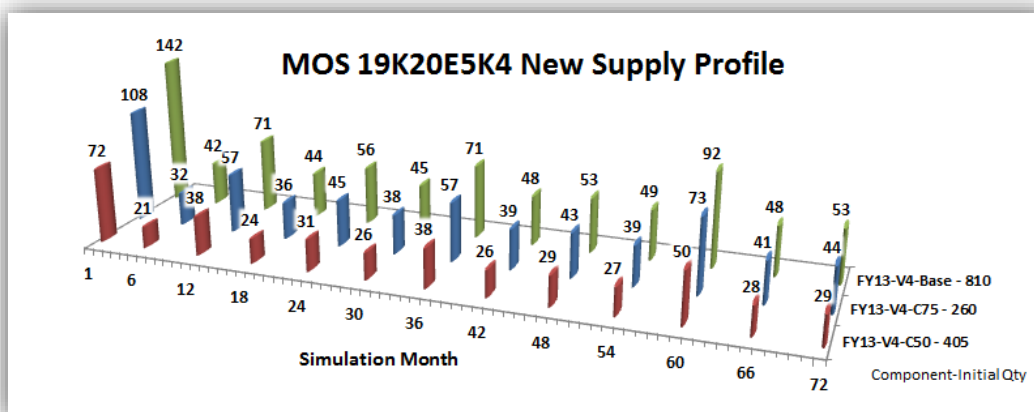**Figure 24. New Supply (MOS 19K30E6K4 – Tank Crew)**

Figure 25. New Supply (MOS 19K20E5K4 – Tank Crew)
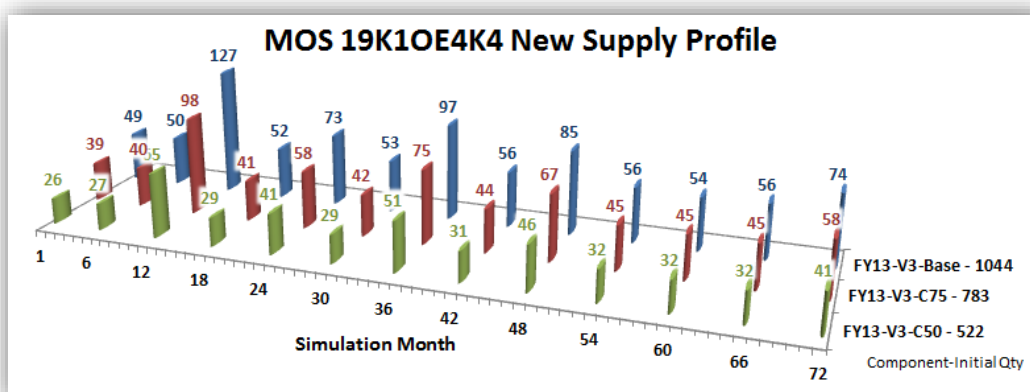
Figure 26. New Supply (MOS 19K10E4K4 – Tank Crew)
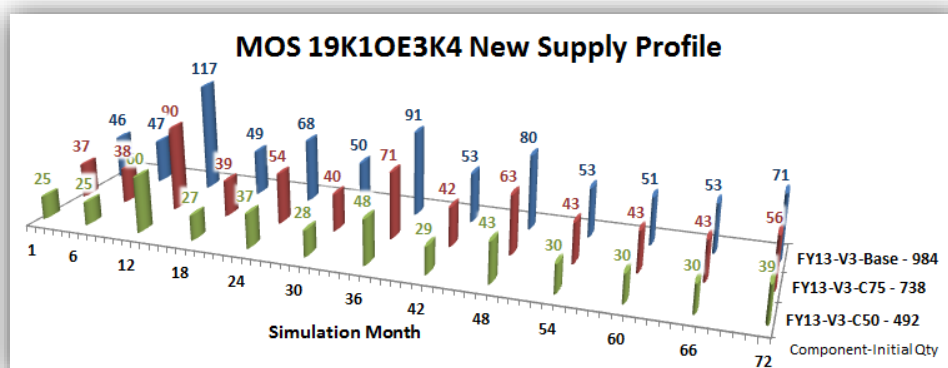
Figure 27. New Supply (MOS 19K10E3K4 – Tank Crew)

Vignette 4 was established as a comparative analysis to vignette 3 using the same parameters in terms of input however, this vignette used the ARFORGEN process as the underlying model vice the FFG model. Similar to vignettes 1 and 2 which

were also ARFORGEN based, this vignette only used one ribbon input file or one "demand profile" which was steady state vice vignette 3 which used three demand profiles. Just like the previous vignettes, vignette 4 also focused the post processing analysis of the three major AC BCT combat systems (Tank, Bradley and Stryker). The following figures display the results for the Tank system for comparison beginning with an unconstrained model run, the base case and two additional constrained model runs with a decrement of new supply at 25% (C75) and 50% (C50). The results are shown below in Figures 28 through 32. Also note that only the Tank system is show as the other systems showed very similar trends.

Figure 28. New Supply (Tank)

Figure 29. New Supply (MOS 19K30E6K4 – Tank Crew)
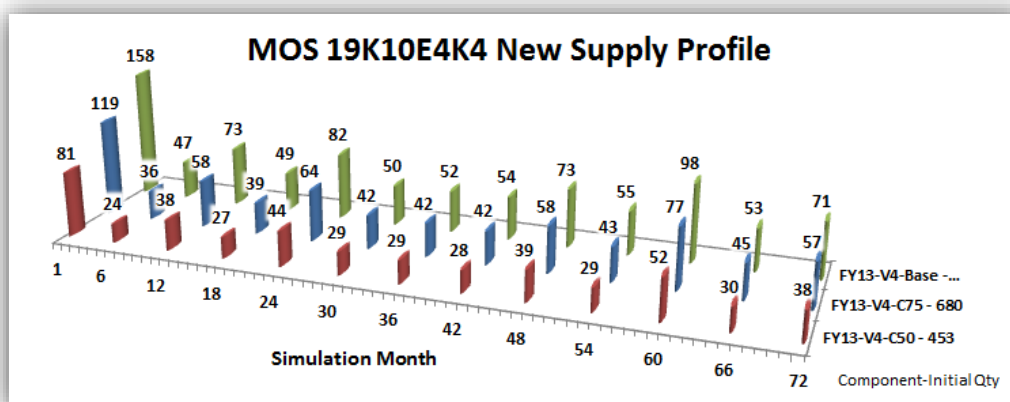
Figure 30. New Supply (MOS 19K20E5K4 – Tank Crew)

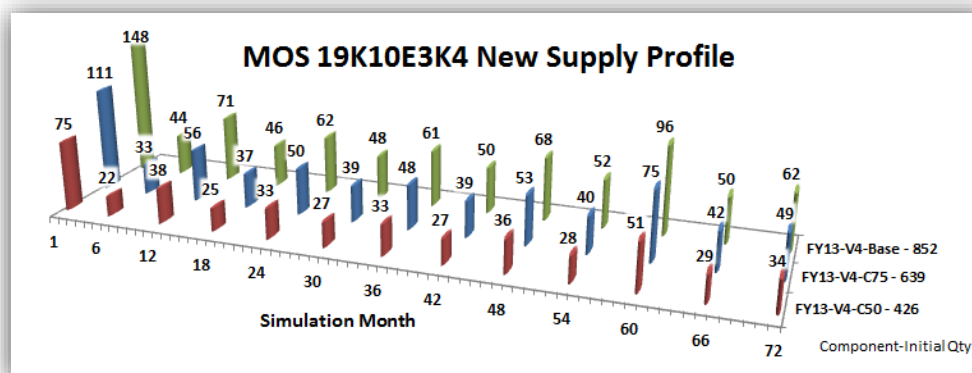Figure 31. New Supply (MOS 19K10E3K4 – Tank Crew)

Figure 32. New Supply (MOS 19K10E3K4 – Tank Crew)

The study team also included additional post processing analysis for vignette 4 in terms of location data in reference to the discussion above in Appendix F, Additional Findings. As discussed previously, the FGRM capabilities are vast and

capable of determining potential future resource requirements in terms of supply and demand by location over time. Figures 33 and 34 display the location analysis of a tank commander and the tank itself related to the amount of resources supplied monthly over the course of the 72 month vignette 4 base case model run. Note that Figure 34 for the Tank displays all 72 months as the data show between the 'every six month' is more relevant.
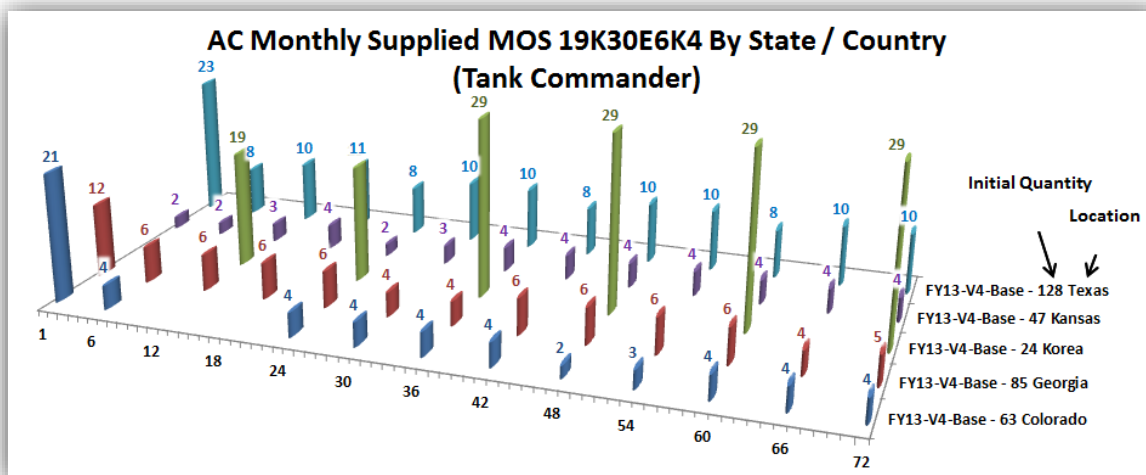
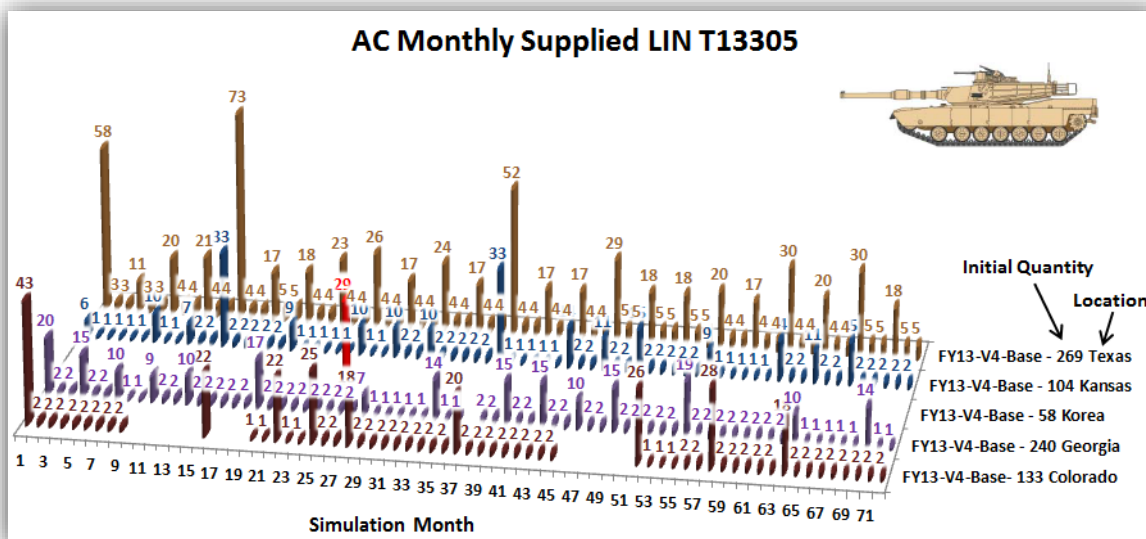

Figure 33. Monthly Supplied Resources by Location (MOS 19K30E6K4)

Figure 34. Monthly Supplied Resources by Location (LIN T13305)